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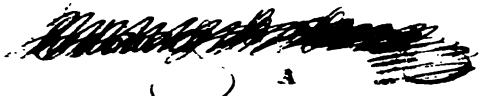
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Walsh
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A

NEW SYSTEM

OF

MERCANTILE ARITHMETIC,

ADAPTED TO THE

Commerce of the United States,

IN ITS

DOMESTIC AND FOREIGN RELATIONS;

WITH

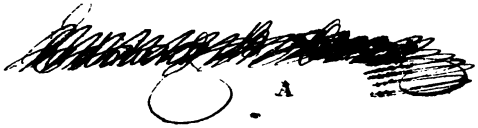
FORMS OF ACCOUNTS, AND OTHER WRITINGS USUALLY OCCURRING IN TRADE.

BY MICHAEL WALSH, A. M.

*Iter est breve per exempla.....*SENECA.

SECOND EDITION.

NEWBURYPORT:
PRINTED BY EDMUND M. BLUNT, (PROPRIETOR,)
No. 8, STATE-STREET,
....
OCT. 1803.



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OCT. 1803.

526638



District of Massachusetts District.

TO WIT——

BE IT REMEMBERED, That on the seventeenth day of April, in the twenty-fourth year of the Independence of the United States of America, MICHAEL WALSH, of the said District, hath deposited in this Office the title of a Book, the right whereof he claims as Author, in the words following, to wit:

'A NEW SYSTEM OF MERCANTILE ARITHMETIC: ADAPTED TO THE COMMERCE OF THE UNITED STATES, IN ITS DOMESTIC AND FOREIGN RELATIONS; WITH FORMS OF ACCOUNTS, AND OTHER WRITINGS USUALLY OCCURRING IN TRADE——BY MICHAEL WALSH.'

In conformity to the Act of the Congress of the United States, intituled 'An Act for the encouragement of learning, by securing the copies of Maps, Charts and Books, to the Authors and Proprietors of such Copies, during the times therein mentioned.'

N. GOODALE, Clerk of the District of Massachusetts District.

A true copy of record,

Attest, N. GOODALE, Clerk.

WOR 19 FEB '36

RECOMMENDATIONS.

Newburyport, May 1, 1800.

WE the subscribers having seen Mr. WALSH's New System of MERCANTILE ARITHMETIC, and being satisfied that it is better calculated than any yet published, to fit a youth for the business of the Compting-House, cannot but wish it an extensive circulation. The happy elucidation and extended application of the common rules, together with the many original improvements, while they accomplish the student for commerce, are also extremely well adapted to assist and inform the merchant, the mariner, and the trader in their various occupations.

Dudley A. Tyng.	*Moses Brown.*
Ebenezer Stocker.	*William Wyer, jun.*
William Bartlet.	*Richard Bartlet, jun.*
Samuel A. Otis, jun.	*William W. Prout.*
Tristram Coffin.	*Michael Little.*

Boston, May 16th, 1800.

WE the subscribers, having examined Mr. WALSH's New System of MERCANTILE ARITHMETIC, and being persuaded that it is better calculated than any we have met with, to qualify young men for admission into Compting-Houses, we wish that it may have an extensive circulation. The clear exemplification and pertinent application of the common rules, together with the many useful additions and improvements which it contains, will render it extremely useful for the merchant, the mariner, and all the other trading classes of society.

Marston Watson.	*John Lowell, jun.*
John C. Jones.	*Joseph Russell.*
John Codman.	*Arnold Welles, jun.*
Stephen Higginson.	*Jonathan Jackson.*

Salem, October 7th, 1800.

WE the subscribers, Merchants of Salem, convinced of the necessity of rendering the forms of business, the value of coins, and the nature of commerce more familiar to the United States as a commercial people, do approve of the MERCANTILE ARITHMETIC of Mr. WALSH, and recommend it as calculated to subserve in the best manner the instruction of our youth, and the purposes of a well-informed merchant.

Wm. Gray, jun.	*Jacob Ashton.*
Benj. Hodges.	*Wm. Prescott.*
B. Pickman.	*Jacob Crowninshield.*
Nath. Bowditch.	*Elias Hasket Derby.*

PREFACE TO THE SECOND EDITION.

THE rapid sale of an extensive edition of "WALSH's MERCANTILE ARITHMETIC" has induced the proprietor, thus early, to present the public with a second impression.

NOTWITHSTANDING the numerous treatises of Arithmetic, which are current in this country, no one of them has, "with the common rules of Arithmetic, as taught in our schools, combined a general knowledge of mercantile calculations at home and abroad, including the exchange as it has actually existed in the latest intercourse between this and foreign countries." The usual routine of business in a compting-house will make a young man a tolerable proficient as a trader; but the character of a Merchant requires a studied knowledge of his profession. A profession as honorable, in this country, as it is useful, when regularly and methodically attained. This work, original in its plan, and upon which the public have already bestowed a very flattering attention, will be found to comprise all the Arithmetical Science, which any Merchant, however extensive his commercial connections, will need.

PREFACE.

EVERY exertion has been made to render the Second Edition as correct as possible. In a work of this kind, in which so many figures are used, errors will often escape the most careful attention. As few however will be found in this, as in any publication. If the most diligent and critical revision will render a work free from typographical mistakes, the proprietor will not hesitate to offer the public the second edition of "WALSH's MERCANTILE ARITHMETIC," in that respect, perfect.

THE recommendations, which accompany both impressions of the work, are from gentlemen of the highest eminence in the mercantile profession. Their countenance and patronage have already given it a currency, which its own merit will undoubtedly preserve.

EDMUND M. BLUNT.

October 28, 1803.

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EXPLANATION

OF THE CHARACTERS USED IN THIS WORK.

= SIGNIFIES equality, or equal to: as, 20 shillings = one pound: that is, 20 shillings are equal to 1 pound.

+ Signifies more, or addition: as 6 + 6 = 12, that is, 6 added to 6 is equal to 12.

— Signifies less, or subtraction; as, 6 — 2 = 4, that is, 6 less 2 is equal to 4.

× Signifies multiplication; as, 6 × 2 = 12; that is, 6 multiplied by 2 is equal to 12.

÷ Signifies division; as 6 ÷ 2 = 3; that is 6 divided by 2 is equal to 3.

Division is some times expressed by placing the numbers like a fraction, the upper figure being the dividend and the lower the divisor: thus, $\frac{54}{6} = 9$; that is, 54 divided by 6 is equal to 9.

: : : : Proportion; as, 3 : 6 :: 9 : 18; that is, as three is to 6, so is 9 to 18.

$\surd$ Prefixed to any number signifies that the square root of that number is required.

ARITHMETIC.

ARITHMETIC is the art of computing by numbers, and has five principal rules for this purpose, viz. *Numeration, Addition, Subtraction, Multiplication* and *Division.*

NUMERATION

Teacheth to express any proposed number by these ten characters, 0. 1. 2. 3. 4. 5. 6. 7. 8. 9.—0 is called a cypher, and the rest figures or *digits.* The relative value of which depends upon the place they stand in, when joined together, beginning at the right hand as in the following

TABLE.

9	8	7	6	5	4	3	2	1
hundreds of millions.	tens of millions.	millions.	hundreds of thousands.	tens of thousands.	thousands.	hundreds.	tens.	units.

Though the table consists of only nine places, yet it may be extended to more places at pleasure; as, after hundreds of millions, read thousands of millions, ten thousands of millions, hundred thousands of millions, then millions of millions, &c.

TO WRITE NUMBERS.

RULE. Write down the figures as their values are expressed, and supply any deficiency in the order with cyphers.

EXAMPLES.

Write down in proper figures the following numbers.
Twenty-nine,
Two hundred and forty-seven,
Seven thousand nine hundred and one,
Eighty-four thousand three hundred and twenty-nine,
Nine hundred and two thousand six hundred and fifteen,
Eighty-nine millions and ninety,
Four millions four hundred thousand and forty,
Nine hundred and nine millions nine hundred and ninety,
Seventy millions seventy thousand and seventy.

Eleven thousand eleven hundred and eleven.		Fourteen thousand fourteen hundred and fourteen.	
eleven thousand	11000	fourteen thousand	14000
eleven hundred	1100	fourteen hundred	1400
eleven	11	fourteen	14
Total	12111	Total	15414

To express in words any number proposed in figures.

RULE. To the simple value of each figure, join the name of its place, beginning at the left hand and reading towards the right.

EXAMPLES.

Write down in words the following numbers.
46, 199, 2267, 86693, 289732, 11911911,
1169990, 9919, 4320, 55000510.

* * * * *

SIMPLE ADDITION

Teacheth to collect numbers of the same denomination into one sum.

EXAMPLES.

Gallons.	Yards.	Bushels.
68965	59473	875496
14753	8914	170900
29684	675	574
57693	29	9
171095		
171095		

denominatio...

	Yards.		
From	57468532	From	
Take	26587491	Take	17[illegible]
Rem.	30881041	Rem.	11750379
Proof	57468532	Proof	29689141

3 from	924357 take	565383	Rem. 358974
4	517684	291872	225812
5	510090	191939	318151
6	191191	2957	188234
7	291619	829	290790
8	500910	15723	485187

.....

SIMPLE MULTIPLICATION

Is a compendious way of adding numbers of the same name.
The number to be multiplied is called the multiplicand.
The number which multiplies is called the multiplier.
The number arising from the operation is called the product

			Quotient.		Rem.
4	Divide 8965462	by 6	Ans. 1494243	and	4
5	3728675	8	466084		3
6	4654682	9	517186		8
7	2768967	10	276896		7
8	1949952	11	177268		4
9	2968967	12	247413		11
10	5268794	20	263439		14
11	29619145	40	740478		25
12	419825367	500	839650		367
13	296876234	64	4638691		10
14	47989536925	735	65291886		715
15	26574983184	8962	2965296		432
16	53479689236	7684	6959876		2052
17	4917968967	2359	2084768		1255
18	3258675689	67435	48323		14184

When the divisor is a compound number, that is, if any two figures, being multiplied together, will make that number, then divide the dividend by one of those figures, and the first quotient by the other figure, and it will then give the quotient required.—But as it sometimes happens that there is a remainder to each of the quotients, and neither of them the true one, it may be found by this

RULE. Multiply the first divisor by the last remainder, and to the product add the first remainder, which will give the true ones.

EXAMPLES.

Divide 296876234 by 64

8)296876234

8)37109529—2

Quotient 4638691 and $1 \times 8 + 2 = 10$ remaining.

Divide 8757635 by 28 Divide 18957492 by 42

Quotient 312772 and 19 rem. 451368 and 36 rem.

Divide 1571196 by 72 Divide 3751749 by 96

Quotient 21822 and 12 rem. 39080 and 69 rem.

MISCELLANEOUS QUESTIONS.

1. Add 562163, 21964, 56321, 18536, 4340, 279, and 83 together. Ans. 663686.

2. What number is it, which being added to 9709 will make 110901? Ans. 101192.

3. General WASHINGTON was born in the year 1732; how old was he in 1799? Ans. 67 years.

4. Add up twice 397, three times 794, four times 3176, five times 15880, six times 95280, and once 333040.
Ans. One Million.

5. A cashier received, viz. Four hundred and nine dollars, twenty thousand and thirteen dollars, Eight thousand five hundred and ten dollars, Nine hundred and twenty-eight dollars; of which he paid away Fifteen thousand fifteen hundred and fifteen dollars: What was the whole sum he received, and how much remains after deducting the payment?
Ans. He received 29860 dolls. and there remains 13345 dollars.

6. What is the product of 15927 multiplied by 4009?
Ans. 63851343.

7. 128 men have one half of a prize, worth 34560 dollars, to be equally divided between them: What is each man's part?
Ans. 135 dollars.
Prove this answer to be right.

8. Three merchants, A, B, and C, have a stock of 14876 dollars, of which A put in 4963 dollars, B 5188 dollars, and C the remainder: How much did C put in?
Ans. 4715 dollars.

TABLE OF MONEY, WEIGHTS, MEASURES, &c.

FEDERAL MONEY.

10 Mills	make	1 Cent.
10 Cents		1 Dime.
10 Dimes, or 100 Cents		1 Dollar.
10 Dollars		1 Eagle.

ENGLISH MONEY.

4 Farthings	make	1 Penny.
12 Pence		1 Shilling.
20 Shillings		1 Pound.

PENCE TABLE.

d.		s.	d.
20	are	1	8
30		2	6
40		3	4
50		4	2
60		5	0
70		5	10
80		6	8
90		7	6
100		8	4
110		9	2
120		10	0
130		10	10
140		11	8
150		12	6
200		16	8

SHILLINGS TABLE.

s.		£.	s.
20	are	1	0
30		1	10
40		2	0
50		2	10
60		3	0
70		3	10
80		4	0
90		4	10
100		5	0
110		5	10
120		6	0
130		6	10
140		7	0
150		7	10
200		10	0

TROY WEIGHT.

24 Grains	make	1 Pennyweight.
20 Pennyweights		1 Ounce.
12 Ounces		1 Pound.

NOTE. By this weight are weighed jewels, gold, silver and liquors.

AVOIRDUPOIS WEIGHT.

16 Drams	make	1 Ounce.
16 Ounces		1 Pound.
28 Pounds		1 Quarter.
4 Quarters		1 Hundred weight.
20 Hundred Weight		1 Ton.

NOTE. By this weight are weighed such commodities as are coarse and subject to waste, and all metals, except gold and silver. One pound Avoirdupois is equal to 14 oz. 11 pwt. and 15½ grs. Troy.

APOTHECARIES WEIGHT.

20 Grains	make	1 Scruple.
3 Scruples		1 Dram.
8 Drams		1 Ounce.
12 Ounces		1 Pound.

NOTE. Apothecaries use this weight in compounding their medicines; but *they buy and sell their drugs* by Avoirdupois weight.

Cloth Measure.

4	Nails	make	1 Quarter.
4	Quarters		1 Yard.
3	Quarters		1 Ell Flemish.
5	Quarters		1 Ell English.
6	Quarters		1 Ell French.

Long Measure.

3	Barley Corns	make	1 Inch.
12	Inches		1 Foot.
3	Feet		1 Yard.
5½	Yards, or 16½ Feet,		1 Pole, Rod, or Perch.
40	Poles		1 Furlong.
8	Furlongs		1 Mile.
3	Miles		1 League.
60 Geographical, or 69½ Statute Miles,			1 Degree.

Note. In this measure, length only is considered.

Land or Square Measure.

144	Square Inches	make	1 Square Foot.
9	Feet		1 Yard.
30¼ Yards, or 272¼ Feet			1 Pole, Rod, or Perch.
40	Poles or Perches		1 Rood.
4	Roods		1 Acre.

Note. This measure respects length and breadth.

Wine Measure.

2	Pints	make	1 Quart.
4	Quarts		1 Gallon.
42	Gallons		1 Teirce.
63	Gallons		1 Hogshead.
84	Gallons		1 Puncheon.
2	Hogsheads		1 Pipe or Butt.
2	Pipes or 4 Hogsheads		1 Tun.

Note. The wine gallon contains 231 cubic inches.

Ale and Beer Measure.

2	Pints	make	1 Quart.
4	Quarts		1 Gallon.
8	Gallons		1 Firkin of Ale.
9	Gallons		1 Firkin of Beer.

2 Firkins		1 Kilderkin.
2 Kilderkins		1 Barrel.
54 Gallons		1 Hhd. of Beer.
3 Barrels		1 Butt.

NOTE. The ale gallon contains 282 cubic inches.

CUBIC OR SOLID MEASURE.

1728 Inches	make	1 Foot.
27 Feet		1 Yard.
40 Feet of round Timber or 50 Feet of hewn Timber		1 Ton or Load.
128 Solid Feet		1 Cord of Wood.

NOTE. 8 feet in length, 4 in breadth, and 4 in height, making 128 solid feet, contain a cord of wood. This measure respects length, breadth and thickness.

DRY MEASURE.

2 Pints	make	1 Quart.
2 Quarts		1 Pottle.
2 Pottles		1 Gallon.
2 Gallons		1 Peck.
4 Pecks		1 Bushel.
2 Bushels		1 Strike.
4 Bushels		1 Coom.
8 Bushels		1 Quarter.
36 Bushels		1 Chaldron.
5 Quarters		1 Wey.
2 Weys		1 Last.

NOTE. The gallon dry measure contains 268$\frac{4}{5}$ cubic inches.

TIME.

60 Seconds	make	1 Minute.
60 Minutes		1 Hour.
24 Hours		1 Day.
365 Days		1 Year.

NOTE. 365 days 5 hours 48 minutes 57 seconds make a solar year, according to the most exact observation.

The number of days in each month is thus found:

Thirty days hath September, April, June, and November;
February hath twenty-eight alone; and all the rest have thirty one.

When the year can be divided by 4 without a remainder, it is Bissextile or Leap-Year, in which February hath 29 days.

COMPOUND ADDITION

Teacheth to collect numbers of different denominations into one total.

Federal Money.

D.	C.	M.	D.	C.	M.
174	74	3	396	14	4
198	19	3	147	19	5
157	14	4	149	57	9
196	76	9	157	83	8

English Money.

£.	s.	d.	£.	s.	d.
149	14	6¾	814	16	6½
387	19	8½	198	18	8¾
259	16	7½	376	14	9½
874	17	4¾	226	16	7¾
678	15	6½	174	17	10½

Troy Weight.

lb.	oz.	dwt.	gr.	lb.	oz.	dwt.	gr.
48	7	14	19	83	11	15	22
95	4	17	22	15	6	16	19
27	5	14	15	21	8	19	23
65	6	19	16	33	9	15	14
19	7	13	15	46	4	13	17

Avoirdupois Weight.

Ton.	Cwt.	qr.	lb.	oz.	dr.	Cwt.	qr.	lb.
18	17	1	14	13	13	593	1	19
36	15	3	16	13	15	187	3	19
29	15	2	19	12	13	159	2	25
14	16	3	27	14	12	283	3	13
16	19	2	25	13	10	146	2	18
57	17	1	14	15	9	259	1	22

Apothecaries' Weight.

lb.	oz.	dr.	sc.	gr.
3	7	5	1	17
1	3	2	2	13
2	5	3	2	14
3	4	2	1	15
5	2	2	2	17
2	3	1	2	18

lb.	oz.	dr.	sc.	gr.
2	5	3	2	11
1	2	2	1	14
3	3	5	2	13
5	5	4	1	12
2	9	3	2	15
1	6	4	2	17

Cloth Measure.

yd.	qr.	nl.
571	1	3
1[illegible]4	[illegible]	2
196	2	3
283	3	2
140	2	3
375	3	2

E.Fl.	qr.	nl.
873	2	3
196	2	2
158	1	1
147	2	3
326	2	2
194	2	1

E.Fr.	qr.	nl.
181	2	2
196	3	3
157	4	2
168	3	3
193	5	2
214	2	3

E.E.	qr.	nl
56	1	[illegible]
19	2	[illegible]
14	3	[illegible]
26	4	[illegible]
83	2	[illegible]
57	3	[illegible]

Wine Measure.

Tun.	hhd.	gal.	qt.	pt.
187	1	17	3	1
56	3	15	2	1
9	1	29	3	1
36	2	18	2	1
217	3	57	1	1
56	1	46	2	1

Tun.	hhd.	gal.	qt.	pt.
176	3	16	2	1
59	2	57	3	1
8	3	14	2	1
17	2	19	1	1
168	1	38	2	1
25	2	52	3	1

Ale and Beer Measure.

hhd.	gal.	qt.	pt.
49	38	2	1
38	45	3	1
57	48	2	1
49	37	1	1
57	26	2	1
28	18	3	1

hhd.	gal.	qt.	pt.
78	17	3	1
19	16	2	1
15	51	3	1
76	43	2	1
23	26	3	1
52	38	2	1

Dry Measure.

qr.	bush.	pck.	qt.
57	4	2	1
19	5	3	1
38	6	2	3
27	7	3	7
5	3	1	4
9	2	2	3
72	5	3	2

chal.	bush.	pck.	qt.
576	31	1	3
19	27	2	2
56	15	3	5
25	8	2	4
9	9	1	6
14	15	2	3
32	26	3	2

Long Measure.

deg.	mil.	fur.	po.	ft.	in.	bar.
217	17	7	19	14	9	1
733	17	4	16	13	3	2
283	53	5	19	12	2	2
346	26	6	23	13	4	1
189	32	3	27	14	5	2
176	14	2	15	15	6	2
921	15	4	18	16	7	1

mil.	fur.	po.	yd.	ft.
876	7	13	4	2
129	6	26	2	1
167	4	19	3	2
157	3	15	2	2
286	2	27	1	1
194	5	32	2	2
176	4	18	5	2

Land Measure.

acr.	roo.	per.
741	1	19
69	3	29
15	2	16
37	3	14
16	2	13
29	3	27

acr.	roo.	per.
870	3	19
19	2	16
54	3	37
129	2	26
187	3	14
136	2	19

Time.

yrs.	days.	hrs.	min.	sec.
187	149	14	13	12
146	126	16	16	16
59	186	19	39	19
28	140	21	46	35
7	119	22	18	26
146	146	19	57	19

yrs.	days.	hrs.	min.	sec.
300	169	14	16	17
19	186	17	16	16
46	147	15	19	19
87	196	23	46	47
157	219	14	33	16
46	138	15	42	13

COMPOUND SUBTRACTION

Teacheth to find the inequality between numbers of divers denominations.

Federal Money.

	dol.	*ct.*	*m.*	*dol.*	*ct.*	*m.*	*dol.*	*ct.*	*m.*
From	1901	95	1	435	00	1	170	10	3
Take	992	97	2	9	15	9	9	50	2

English Money.

	£.	*s.*	*d.*	£.	*s.*	*d.*
From	191	11	3½	304	19	8½
Take	114	16	2½	126	16	8½
From	389	18	0½	100	0	5
Take	9	19	4	11	11	2¾

Troy Weight.

	lb.	*oz.*	*dwt.*	*gr.*	*lb.*	*oz.*	*dwt.*	*gr.*
From	87	11	11	13	27	10	15	22
Take	19	11	14	22	15	9	16	23

Avoirdupois Weight.

	ton.	*cwt.*	*qr.*	*lb.*	*oz.*	*dr.*	*cwt.*	*qr.*	*lb.*
From	100	10	1	11	14	13	59	1	11
Take	15	13	1	18	12	15	19	3	27

Apothecaries' Weight.

	lb.	*oz.*	*dr.*	*sc.*	*gr.*	*lb.*	*oz.*	*dr.*	*sc.*	*gr.*
From	2	3	4	1	13	2	1	3	1	15
Take	1	7	5	2	10	1	4	2	2	17

Cloth Measure.

	yd.	*qr.*	*nl.*	*E.Fl.*	*qr.*	*nl.*	*E.E.*	*qr.*	*nl.*	*E.Fr.*	*qs.*	*nl.*
From	251	1	2	189	2	1	419	1	3	389	2	2
Take	127	3	3	120	2	2	174	3	2	189	3	3

Wine Measure.

	tun.	*hd.*	*gal.*	*qt.*	*pt.*	*tun.*	*hd.*	*gal.*	*qt.*	*pt.*
From	591	1	13	1	1	800	1	50	2	1
Take	126	2	56	3	1	149	2	61	3	1

Ale and Beer Measure.

	hd.	*gal.*	*qt.*	*pt.*	*hd.*	*gal.*	*qt.*	*pt.*
From	571	19	3	1	100	36	2	1
Take	198	53	2	1	9	27	3	1

Dry Measure.

	qr.	*bu.*	*gal.*	*qt.*	*chal.*	*bu.*	*gal.*	*qt.*
From	38	4	5	3	69	21	3	2
Take	17	5	1	2	49	33	5	3

Long Measure.

	deg.	*m.*	*fur.*	*p.*	*f.*	*in.*	*bc.*	*m.*	*fur.*	*p.*	*f.*
From	819	13	1	19	11	3	1	219	3	14	11
Take	159	49	2	27	16	8	2	209	7	15	12

Land Measure.

	acr.	*roo.*	*per.*	*acr.*	*roo.*	*per.*	*acr.*	*roo.*	*per.*
From	591	1	11	501	3	13	219	2	21
Take	129	3	15	190	2	21	156	1	36

Time.

	yrs.	*da.*	*hr.*	*m.*	*sec.*	*yrs.*	*da.*	*hr.*	*m.*	*sec.*
From	171	143	11	14	19	811	111	15	23	52
Take	128	174	19	51	14	389	190	21	48	54

PRACTICAL QUESTIONS IN COMPOUND ADDITION AND SUBTRACTION.

1. Cast up the following sums, viz. twenty-three shillings and five pence, one pound and nine pence, seven shillings and eleven pence three farthings, twenty pounds thirteen shillings and nine pence, fifteen pence three farthings.

	£.	s.	d.
	1	3	5
	1	0	9
	0	7	11¾
	20	13	9
	0	1	3¼
Ans.	£.23	7	2½
Proof	£.23	7	2½

2. Twenty dollars and four cents, five dollars and three mills, eighty-two cents, six dollars and five mills.
Ans. 31 dols. 86 cts. 8 m.

3. Seventy dollars, three dollars and three cents, thirty-four cents and four mills, eighty dollars and a half, six dollars and a quarter. Ans. 160 dols. 12 cts. 4 mills.

4. Ten pounds and three pence, forty-five shillings and ten-pence half-penny, thirty-seven shillings and four-pence three farthings, nine pounds and three farthings, one shilling and six pence farthing, eighty-two shillings and four-pence half penny. Ans. £.27 7 5¾

5. Thirty dollars six cents and a half, fifty-three cents and three quarters, eleven cents and a quarter, nine dollars eleven cents and a half, fifty-four cents. Ans. 40 dols. 37 cents.

6. Take three shillings and four pence from one pound two shillings and a penny. Ans. 18*s.* 9*d.*

7. From £.5 2*s.* 1*d.* take nine shillings and six-pence half-penny. Ans. £.4 12 6½

8. Take twenty shillings and three farthings from £.8.
Ans. £.6 19 11¼

9. From 18 dollars take eight mills.
Ans. 17 dols. 99 cts. 2 m.

10. Take 53 dimes from 53 eagles.
Ans. 524 dols. 7 dimes or 70 cts.

11. A merchant bought 112 bars of iron weighing 56 cwt. 1 *qr.* 11 *lb.* of which he sold 59 bars, weighing 29 cwt. 3 qrs.

21 lb.; how many bars has he remaining, and what is the weight? Ans. 53 bars, weighing 26 cwt. 1 qr. 18 lb.

12. Required the total weight of 4 hogsheads of sugar weighing as follows, viz. No. 1. 9 cwt. 2 qrs. 21 lb. No. 2. 10 cwt. 3 qrs. 23 lb. No. 3. 8 cwt. 2 qrs. 25 lb. No. 4. 9 cwt. 3 qrs. 17 lb. Ans. 39 cwt. 1 qr. 2 lb.

13. A ropemaker received 3 tons 15 cwt. 3 qrs. 14 lb. of hemp to be wrought, of which he delivered in cordage 34 cwt. 1 qr. 22 lb.; how much remains?

Ans. 2 tons 1 cwt. 1 qr. 20 lb.

14. Received 57953 mills, 4953 cents, 1913 dimes and 45 eagles; required the total sum.

Ans. 748 dols. 78 cts. 3 mills.

15. A cashier received, viz. one hundred pounds and ninepence half-penny, three thousand seven hundred and four pounds ten shillings, twenty thousand and ninety pounds two shillings and eleven pence three farthings, of which he paid away sixteen thousand sixteen hundred and sixteen pounds; how much has he on hand? Ans. £.6278 13 9¾

16. A farmer bought three pieces of land, measuring, viz. the first piece 21 acres 3 roods 19 poles; the second, 37 acres 2 roods 29 poles; the third, 27 acres 2 roods 25 poles; of which he sells 15 acres 2 roods 39 poles; how much has he remaining? Ans. 71 acres 1 rood 34 poles.

17. A has paid B £.9 15 6¼ £.19 11 9¾ £.14 19 7½ and 54*s.* 3¼*d.* on account of a debt of £.50; how much is there still unpaid? Ans. £.2 18 9½

REDUCTION.

REDUCTION teacheth to change numbers from one denomination to another, without losing their value.

RULE. When the Reduction is descending, multiply the highest denomination by as many of the next less as make one of the greater, adding to the product the parts of the same name, and so on to the last.

When the Reduction is ascending, divide the given number by as many of that denomination as make one of the next higher, and so on to the denomination required, and the last quotient with the several remainders (if any) will be the answer.

The proof is by reversing the question.

Federal Money.

1. In 53 dollars how many mills?

53 dolls. | Or decimally, by adding a cypher
10 | for each inferior denomination, thus,
530 dimes.
10
5300 cents. d.d.c.m. 53.000
10

Ans. 53000 mills.

2. In 11000 mills how many dollars?

10)11000 | Or decimally, by separating the figures,
10)1100 | counting from the right to the name
10)110 | required, thus,
d.d.c.m.
11.000

Ans. 11 dolls.

3. In 5793 mills how many dollars?

Ans. 5 dollars, 79 cents and 3 mills.

4. How many eagles in 1933 dimes?

Ans. 19 eagles, 3 dollars, 3 dimes.

5. In 1290 mills how many dimes?

Ans. 12 dimes and 9 cents.

6. How many cents in 46 dollars? Ans. 4600 cents.

7. In 190004 mills how many dollars?

Ans. 190 dollars and 4 mills.

English Money.

1. In £91 11 3½ how many farthings?

		Proof.
91	11 3½	4)87902
20		
1831	shillings.	12)21975—2
12		
21975	pence.	20)1831—3
4		£.91 11 3½
87902	farthings.	

Ans. 87902 farthings.

2. How many pounds in 3175 farthings? Ans. £3 6 1½

3. In 19*s*. 8¾*d*. how many farthings? Ans. 947 farthings.
4. How many pounds in 9752 pence? Ans. £.40 12 8
5. In £.46 how many crowns of 6*s*. 7*d*. each?
Ans. 139 crowns and 4 shillings and 11 pence.
6. How many pounds in 493 dollars? Ans. £.147 18
7. In 143 pence how many shillings? Ans. 11*s*. 11*d*.
8. Reduce 38*s*. 4½*d*. to half pence. Ans. 921 half pence.
Prove the above answers to be right.

Troy Weight.

1. In 15lb. troy how many grains? Ans. 86400 grs.
2. How many ounces in 5749 dwt.? Ans. 287 oz. 9 dwt.
3. In 11 oz. 13 dwt. 13 grs. how many grains?
Ans. 5605 grs.
4. How many grains in 15 spoons, each weighing 6 dwt. 15 grs.? Ans. 2385 grs.

Avoirdupois Weight.

1. In 19 tons 14 cwt. 2 qrs. 19 lb. 11 oz. 13 drs. how many drams? Ans. 11316157 drs.
2. How many cwt. in 9563 lb.?
Ans. 85 cwt. 1 qr. 15 lb.
3. In 13 cwt. 3 qrs. 21 lb. how many pounds?
Ans. 1561 lb.
4. How many mess-pieces of 4½ lb. and 3½ lb. of each an equal number, in 31 cwt. 1 qr. 12 lb. of beef?
Ans. 439 pieces of each.

Wine Measure.

1. In 25 tuns of wine how many pints? Ans. 50400 pints.
2. How many hogsheads in 4935 quarts?
Ans. 19h. 36g. 3qt.
3. In 3 hhds. 13 gals. 2 qts. how many half pints?
Ans. 3240 half pints.

Cloth Measure.

1. In 158 yards how many nails? Ans. 2528 nails.
2. How many ells English in 5932 nails?
Ans. 296 ells 3 qrs.
3. In 29 pieces of holland, each containing 36 ells Flemish, how many yards? Ans. 783 yds.

Long Measure.

1. In 29 miles how many inches? Ans. 1837440 inches.
2. How many furlongs in 19753 yards?
Ans. 89 fur. 173 yds.
3. In 596057 inches how many leagues?
Ans. 3 leag. 2 fur. 110 yds. 1 f. 5 in.

Time.

1. How many hours in 57 years, allowing each year to be 365 days 6 hours? Ans. 499662 hours.
2. In 57953 hours how many weeks?
Ans. 344 w. 6 da. 17 hr.
3. How many days from 19th March to the 23d September following? Ans. 188 days.
4. How many days from 24th May, 1797, to 15th December, 1798? Ans. 570 days.

Land Measure.

1. In 41 acres 2 roods 14 perches, how many rods?
Ans. 6654 rods or perches.
2. How many square rods in 7752 square feet?
Ans. 28 rods 129 feet.
3. In 5972 perches, how many acres?
Ans. 37 ac. 1 rood 12 per.

Solid Measure.

1. In a pile of wood 96 feet long, 5 feet high, and 4 feet wide, how many cords? Ans. 15 cords.
2. In 82 tons of round timber how many inches?
Ans. 5667840 inches.
3. What are the contents of a load of wood, 6 feet long, 4 feet high, and $2\frac{1}{4}$ feet wide? Ans. $3\frac{3}{4}$ feet.

GRINDSTONES are sold by the cubic foot, commonly called a stone, and the contents are thus found:

Rule. To the whole diameter add half of the diameter, and multiply the sum of these by the same half, and this product by the thickness; divide this last number by 1728, the inches in a cubic foot, and the quotient is the contents, or answer required.

EXAMPLES.

4. How many cubic feet in a grindstone, 24 inches diameter, and 4 inches thick?

24 diameter.
12 half diameter.

36
12

432
4 thickness.

1728)1728

Ans. 1 foot.

5. What are the contents of a grindstone, 36 inches diameter, and 4 inches thick?

36
18

54
18

432
54

972
4

1728)3888(2¼
3456

432
4

1728)1728(1
1728

Ans. 2¼ cubic feet.

AMERICAN MONIES.

To change New-England and Virginia currency to Federal money, the dollar being 6 shillings.

RULE. As the value of a dollar is equal to three-tenths of a pound, when pounds are given to be changed, annex three cyphers to the sum, and divide the whole by 3; the quotient is the answer in cents.

EXAMPLES.

1. Change £.523 to Federal money.

3)523000

174333⅓ cents. Ans. 1743 dols. 33⅓ cts.

Change the following sums, viz.

	£.		dols.	cts.
2.	184	Ans.	613	33⅓
3.	29		96	66⅔
4.	57		190	
5.	219		730	
6.	81		270	
7.	127		423	33⅓

When pounds and shillings are given, to the pounds annex half the number of shillings and two cyphers, if the number of shillings in the given sum be even; but if the number be odd, annex half the number, and then 5 and one cypher, and divide by 3; the quotient is the answer in cents.

EXAMPLES.

1. Change £.59 18*s.* to Federal money.

3)59900

19966⅔ cts. Ans. 199 dols. 66⅔ cts.

2. Change £.93 13*s.* to Federal money.

3)93650

31216⅔ cts. Ans. 312 dols. 16⅔ cts.

Change the following sums, viz.

	£.	s.		dols.	cts.
3.	129	13	Ans.	432	16⅔
4.	63	15		212	50
5.	27	18		93	
6.	182	19		609	83⅓
7.	57	16		192	66⅔
8.	121	7		404	50

When there are shillings, pence, &c. in the given sum, annex for the shillings as before directed, and to these add the farthings in the given pence and farthings, observing to increase their number by one when they exceed 12, and by two when they exceed 37, and divide as before.

EXAMPLES.

1. Change £.21 8s. $4\frac{1}{2}d.$ to Federal money.

3)21419

$7139\frac{2}{3}$ cts.

4 is annexed to the pounds for half the shillings, and 19 for the farthings in $4\frac{1}{2}d.$ and excess of 12.

Ans. 71 dols. $39\frac{2}{3}$ cts.

2. Change £.117 16s. 2d. to Federal money.

3)117808

$39269\frac{1}{3}$ cts. Ans. 392 dols. $69\frac{1}{3}$ cts.

3. Change £.721 9s. $11\frac{1}{4}d.$ to Federal money.

3)721497

240499 cts.

In this example 4 is annexed to the pounds for half the even shillings, and 47 for the farthings in $11\frac{1}{4}d.$ and excess of 37, and then 5 is added to the figure next to half the shillings, making it 9 in place of 4 for the odd shilling.

Ans. 2404 dols. 99 cts.

4. Change £.29 11s. $2\frac{1}{4}d.$ to Federal money.

3)29559

9853 cts. Ans. 98 dols. 53 cts.

Change the following sums, viz.

	£.	s.	d.		dols.	cts.
5.	25	19	9	Ans.	86	$62\frac{1}{2}$
6.	24	11	$7\frac{3}{4}$		81	94
7.	1238	10	$9\frac{1}{2}$		4128	$46\frac{2}{3}$
8.	2001	1	$3\frac{1}{2}$		6670	$21\frac{2}{3}$
9.	153	17	6		512	$91\frac{2}{3}$

A TABLE

FOR CHANGING SHILLINGS AND PENCE INTO CENTS AND MILLS.

	0	*shill.* 1	*shill.* 2	*shill.* 3	*shill.* 4	*shill.* 5
pence.	*cts. m.*	*cts. m.*	*cts. m.*	*cts. m.*	*cts. m.*	*cts. m.*
0		16 7	33 3	50 0	66 7	83 3
1	1 4	18 1	34 7	51 4	68 1	84 7
2	2 8	19 5	36 1	52 8	69 5	86 1
3	4 2	20 9	37 5	54 2	70 9	87 5
4	5 6	22 3	38 9	55 6	72 3	88 9
5	7 0	23 7	40 3	57 0	73 7	90 3
6	8 3	25 0	41 7	58 3	75 0	91 7
7	9 7	26 4	43 0	59 7	76 4	93 0
8	11 1	27 8	44 4	61 1	77 8	94 4
9	12 5	29 2	45 8	62 5	79 2	95 8
10	13 9	30 6	47 2	63 9	80 6	97 2
11	15 3	32 0	48 6	65 3	82 0	98 6

To change Federal Money to New-England and Virginia currency.

RULE. When the sum is dollars only, multiply it by 3 and double the first figure of the product for shillings, and the rest of the product will be pounds.

When there are cents in the given sum, multiply the whole by 3 and cut off three figures of the product to the right hand as a remainder.

Multiply this remainder by 20 and cut off as before.

Proceed in this manner through the several parts of a pound, and the numbers standing on the left hand, make the answer, in the several denominations.

NOTE. If there be mills, cut off four figures and proceed as above.

EXAMPLE.

1. Change 872 dollars to New-England currency.

872	
3	£. s.
261 12	Ans. 261 12

2. Change 1971 dols. 96⅔ cts. to Massachusetts currency.

	1971 96⅔
	3
	£.591,590
	20
	s. 11,800
	12
	d. 9,600
	4
	f. 2,400
Ans.	£.591 11 9½

3. Reduce 1259 dols. 89 cts. and 7 mills, to Mass. currency.

	1259 89 7
	3
	£.377,9691
	20
	s. 19,3820
	12
	d. 4,5840
	4
	f. 2,3360
Ans.	£377 19 4½

A TABLE

FOR CHANGING CENTS INTO SHILLINGS, PENCE AND FARTHINGS.

		Cents. 10		Cents. 20		Cents. 30		Cents. 40		Cents 50		Cents. 60		Cents. 70		Cents. 80		Cents. 90	
cents	d.	s.	d.	s.	d	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
0			7¼	1	2½	1	9¾	2	4½	3	0	3	7½	4	2½	4	9¼	5	4½
1	½		8	1	3	1	10	2	5	3	0½	3	8	4	3	4	10	5	5
2	1½		8½	1	3½	1	11	2	6¼	3	1¼	3	8¾	4	3¾	4	11	5	6¼
3	2¼		9¼	1	4¼	1	11½	2	7	3	2¼	3	9¼	4	4¼	4	11½	5	7
4	3		10	1	5¼	2	0½	2	7½	3	2½	3	10	4	5¼	5	0½	5	7½
5	3¾		10½	1	6	2	1¼	2	8½	3	3¼	3	10½	4	6	5	1¼	5	8¼
6	4½		11¼	1	6¾	2	2	2	9	3	4¼	3	11¼	4	6¾	5	2	5	9
7	5	1	0¼	1	7½	2	2¾	2	9¾	3	5	4	0¼	4	7¼	5	2¾	5	9¾
8	5¾	1	1	1	8	2	3¼	2	10½	3	5¾	4	1	4	8	5	3¼	5	10½
9	6¾	1	1¾	1	8¾	2	4	2	11¼	3	6¾	4	1¾	4	8¾	5	4	5	11¼

To change New-York and North-Carolina currency to Federal money, the dollar being 8 shillings.

RULE. Prepare the given sum by the rule for New-England money, and divide by 4; the quotient is the answer in cents.

EXAMPLES.

1. Change £461 to Federal money.

4)461000

115250 cts. Ans. 1152 dolls. 50 cts.

2. Change £419 10*s*. 8½*d*. to Federal money.

4)419535

104883¾ cts. Ans. 1048 dolls. 83¾ cts.

To change Federal money to New-York & North-Carolina currency.

RULE. As for Massachusetts currency, using 4 as a multiplier instead of 3; the value of a dollar being equal to fourteenths of a pound.

EXAMPLES.

1. Change 1684 dollars to New-York and North-Carolina currency.

1684
4

Ans. £.673 12

2. Change 1048 dols. 83¾ cents to New-York currency.

1048,83¾
4

419,535
20

10,700
12

8,400
4

1,600 Ans. £.419 10*s*. 8½*d*.

To change New-Jersey, Pennsylvania, Delaware and Maryland currency to Federal money, the dollar being 7s. 6d.

RULE. As the value of a dollar is equal to ⅜ of a pound, multiply the given sum, when it is pounds only, by 8, and divide by 3 for dollars. If there be shillings, &c. increase the sum in pence by ⅓ of the whole sum for cents.

EXAMPLES.

1. Change £471 to Federal money.

471
8

3)3768

Ans. 1256 dollars.

2. Change £480 19*s.* 9*d.* to Federal money.

480 19 9
20

9619
12

9)115437
12826⅓

128263⅓ cents. Ans. 1282 dols. 63⅓ cts.

To change Federal money to New-Jersey, Pennsylvania, Delaware and Maryland currency.

RULE. Multiply the sum, when in dollars, by 3, and divide by 8 for pounds. If there be dollars and cents, multiply the given sum by 90, and the product (rejecting two figures on the right) is pence, or deducting $\frac{1}{10}$ of the sum gives the pence likewise.

EXAMPLES.

1. Change 1256 dollars to Pennsylvania currency.

1256
3

8)3768

Ans. £.471

2. Change 1282 dolls. 63⅓ cts. to Pennsylvania currency.

128263⅓	Or $\frac{1}{10}$)128263⅓
90	12826⅓
12)115437,00	12)115437
20)9619—9	20)9619—9
Ans. £.480 19 9	£.480 19 9 as before.

To change South-Carolina and Georgia currency to Federal money, the dollar being 4s. 8d.

RULE. As the value of a dollar is equal to $\frac{7}{30}$ of a pound, if the sum be pounds only, multiply it by 30, and divide by 7 for dollars. If there be shillings, &c. annex two cyphers to the pence in the given sum, and divide by 56, the pence in a dollar, the quotient is the answer in cents.

EXAMPLES.

1. Change £.28 to Federal money.

28
30
7)840
120 Ans. 120 dols.

2. Change £.11 4 8 to Federal money.

11 4 8
20
224
12
8×7=56 8)269600
7)33700
4814⅜ cts. Ans. 48 dols. 14⅜ cts.

To change Federal money to South-Carolina and Georgia currency.

RULE. Multiply the dollars by 7, and divide by 30 for pounds. If there be dollars and cents multiply by 56, and the product (rejecting two figures on the right) is the answer in pence.

EXAMPLES.

1. Change 540 dollars to S. Carolina and Georgia currency.

540
7
3|0)378|0
Ans. £.126

2. Change 48 dols. 14⅜ cts. to South-Carolina currency.

4814⅜ 56
56 2
28884 7)112
24070 16
16
12)2696,00
20)224—8
11 4 8

To change Canada and Nova Scotia currency to Federal money, the dollar being 5 shillings.

RULE. As the value of a dollar is equal to one-fourth of a pound, multiply the sum, when in pounds, by 4, for dollars.

When there are shillings, &c. reduce the given sum to pence, annex two cyphers, and divide by 60, for cents.

EXAMPLES.

1. Change £.36 Canada currency to Federal money.

36
4

Ans. 144 dols.

2. Change £.528 12*s*. 6*d*. Canada currency to Federal money.

20	Or thus,	528	
		4	
10572			
12		2112	
	10 shill. =	2	
6|0)126870|0	2*s*. 6*d*. =	0	50
211450 cts.		2114	50

Ans. 2114 dols. 50 cts.

To change Federal money to Canada and Nova-Scotia currency.

RULE. Divide the sum in dollars by 4 for pounds.

If there be dollars and cents, multiply the given sum by 60, and the product (rejecting two figures on the right) is the answer in pence.

EXAMPLES.

1. Change 144 dollars to Canada currency.

4)144

Ans. £.36

2. Change 2114 dolls. 50 cts. to Canada or Nova-Scotia currency.

211450
60

12)126870\|00

2\|0)1057\|2—6

528 12 6 Ans. £.528 12*s*. 6*d*.

COMPOUND MULTIPLICATION

Is the multiplying of numbers of different denominations, by a simple figure or figures whose product shall be equal to a proposed number.

I. When the quantity does not exceed 12, multiply the price by the quantity, and the product will be the answer.

Multiply by	£.	s.	d.		£.	s.	d.
	191	17	$8\frac{1}{2}$		913	11	$9\frac{3}{4}$
			2				5
Ans.	£.383	15	5		£.4567	19	$0\frac{3}{4}$
	£.980	19	$11\frac{3}{4}$		£.209	18	$4\frac{1}{2}$
			12				9

1. What will 7 yards of shalloon come to at 3*s.* 5*d.* per yard?

	s.	d.
	3	5
		7
£.1	3	11

		s.	d.	£.	s.	d.
2.	4 lb. tea	6	8	1	6	8
3.	5 bushels rye	5	9	1	8	9
4.	6 gallons wine	7	5	2	4	6
5.	7 quintals fish	19	6	6	16	6
6.	9 cwt. iron	29	10	13	8	6
7.	11 gallons brandy	8	5	4	12	7
8.	12 quintals fish	22	10	13	14	0

II. If the number or quantity exceeds 12, and is to be found in the table, multiply by its component parts.

EXAMPLES.

		s.	d.
1.	14 yards durant at	2	5
			2
		4	10
			7
	Ans. £.1	13	10

		s.	d.	£.	s.	d.
2.	16 yards silk at	4	9	3	16	0
3.	20 lb. coffee	1	9½	1	15	10
4.	28 gallons rum	6	5¾	9	1	5
5.	45 cwt. iron	29	6	66	7	6
6.	56 yards broadcloth	28	7	80	0	8
7.	63 pair shoes	9	3	29	2	9
8.	84 quintals fish	18	6	77	14	0
9.	100 galls. molasses	3	5½	17	5	10
10.	121 bushels corn	4	3	25	14	3
11.	144 gallons brandy	5	7¾	40	13	0

To multiply by fractional parts, as ½, ¾, ⅞, &c.

RULE. Multiply the price by the upper figure of the fraction, and divide the product by the lower, the quotient will be the answer; but when the upper figure is not more than one, dividing the price or sum by the lower figure gives the answer.

EXAMPLES.

1. What is ⅜ of a yard of cambric worth, at 12*s.* 6*d.* per yard?

12 6
3

8)37 6

Ans. 4*s.* 8¼*d.*

2. What is ¾ of a yard of broadcloth worth, at 35*s.* per yard?

35
3

4)105

Ans. 26*s.* 3*d.*

Or thus, 2)35

2)17 6 price of half a yard.
8 9 a quarter.

26 3

3. One quarter of a yard of fine linen, at 7*s.* 6*d.* per yard.

4)7 6

Ans. 1*s.*10½*d.*

4. Multiply £.4 5*s.* 3*d.* by ⅓, or take ⅓ of it.

3)4 5 3

Ans. £. 1 8 5

3. Multiply £.9 6s. 8d. by $\frac{7}{8}$, or take $\frac{7}{8}$ of it.

9	6	8
		7
8)65	6	8
Ans. £.8	3	4

III. When the number does not exceed the table, and it cannot be found in it, find the nearest to it, either less or greater; then, after having found the price of this number, add or subtract the value of so many, as it is less or greater than the given number.

EXAMPLES.

1. 37 bushels of corn, at 4s. 11d. per bushel.

	4	11	
		6	
1	9	6	
		6	
8	17	0	price of 36 bushels.
	4	11	price of 1 bushel.
Ans. £.9	1	11	price of 37 bushels.

			s.	d.		£.	s.	d.
2.	17¼	yards shalloon	at	2	8	Ans.	2	6	0
3.	23½	lb. coffee		1	10½		2	4	6¼
4.	57¼	galls. rum		4	2½		12	1	11¾
5.	87¾	yds. baize		2	1		9	2	9¾
6.	109	quintals fish		14	6		79	0	6
7.	137¼	gallons of molasses		3	8½		25	6	1¼

IV. When the number is above the table, find the price of each figure as in the following—

EXAMPLES.

1. 178 yards of muslin at 4*s*. 5*d*. per yard.

	4	5	
		10	
2	4	2	
		10	
22	1	8	price of 100 yards.
15	9	2	price of 70
1	15	4	price of 8
Ans. £.39	6	2	price of 178 yards.

2. 284½ gallons of molasses, at 3*s*. 9½*d*. per gallon.

	3	9½	
		10	
1	17	11	
		10	
18	19	2	
		2	
37	18	4	price of 200 gallons.
15	3	4	price of 80
	15	2	price of 4
	1	10½	price of ½
Ans. £.53	18	8½	price of 284½ gallons.

		s.	*d*.		£	*s*.	*d*.
3.	183 galls. gin ···· at ··	7	5	···· Ans. ··	67	17	3
4.	345 quintals of fish ····	23	9	·····	409	13	9
5.	769¾lb. coffee ·····	1	10	·····	70	11	2½
6.	809½ yds. baize ·····	2	1½	·····	86	0	2½
7.	2375½ gals. of molasses	3	5½	·····	410	15	3½

8. Three barrels of N. E. rum, containing 31, 32½, and 33¼ gallons, at 4*s*. 7½ per gallon. Ans. £.22 7 5½.

9. Four hogsheads of molasses, containing 97½, 99½, 105½ and 111¾ gallons, at 3*s*. 8¾*d*. per gallon, are delivered by A to B, to whom he owed 258 dollars. It is required to know the balance, and in whose favour it is?

Ans. 4*s*. 1½*d*. in favour of B.

When the amount of a cwt. is required at a certain rate per lb.

Rule. Find the price of one or two quarters, and multiply the product by the component parts of a cwt.

1 cwt of Flour, at 3*d.* per lb.

3
7
---
1 9
8
---
14 0 price of two quarters.
2

Ans. £.1 8 0 price of one cwt.

Or by inverting the question thus,

9 4 the price of 112 lb. at 1*d.* pr. lb.
8

£.1 8 0 the price of 112 lb. at 3*d.* per lb.

			d.		£.	*s.*	*d.*
2.	Two cwt.	Flour ..	2¼	per lb.	2	6	8
3.	Three ..	Rice ..	2¾	.....	3	17	0
4.	Four ..	Iron ..	3½	.....	6	1	4
5.	Five ..	Indigo ..	8*s.*11½*d.*	.....	250	16	8

1. What will 4000 feet of boards come to at 38*s.* 4*d.* per thousand.

1 18 4
4 M.

Ans. £.7 13 4

2. 3,596 feet of boards at 36*s.* per thousand.

3,596
36

21576
10788
---
shills. 129,456

Ans. £.6 9 5

In this example three figures are pointed off as a remainder, and the fourth figure of the product of this remainder, multiplied by 12, is set down for pence.

3. 853 feet of boards at 30*s*. per thousand.

853
30

shills. 25,590

Ans. £.1 5 7

4. 3,231 feet of 3 inch W. O. plank, 225*s*. £.36 6 11
5. 8,637 .... 2½ 150*s*. 64 15 6
6. ,960 .... 2 .. .. .. 100*s*. 4 16 0
7. ,888 .... 2½ pine, ... 100*s*. 4 8 9

Plank are sold per thousand of 2½ inches, the usual thickness for planking vessels, and as there are generally other dimensions as 2 and 3 inches, the price of each is regulated by the price of the 2½, adding to it, or subtracting from it, in such proportion as may be agreed on when purchasing. In the above example, taken from an actual sale, ½ of 150*s*. was added to it, for the three inch, and ¼ deducted from it for the two inch, making the three inch 225*s*. and the two-inch 100*s*. per thousand.

WEIGHTS AND MEASURES.

	lb.	*oz.*	*dwt.*	*grs.*		*lb.*	*oz.*	*dwt.*	*grs*
Multiply	14	9	14	17		825	8	19	22
by				5					8
Product	74	0	13	13		6605	11	19	8

T.	*cwt.*	*qt.*	*lb.*
19	17	3	25
			9

Cwt.	*qrs.*	*lb.*	*oz.*	*drs.*
17	1	14	11	14
				7

T.	*hhd.*	*gal.*
87	1	57
		5

T.	*p.*	*hhd.*	*gal.*
28	1	1	62
			7

What is the weight of 47 casks of rice, each weighing 2C. 1*qr*. 23*lb*. ? Ans. 115 cwt. 1 qr. 17 lb.

BILLS OF PARCELS.

Boston, June 28, 1803.

Mr. GEORGE ROWE *bought of* WILLIAM RUSSELL,

		s.	*d.*			
8	pair worsted hose	at 4	6	£.1	16	0
5	do. thread do.	3	2	0	15	10
3	yds. kerseymere	14	0	2	2	0
6	do. muslin	4	2	1	5	0
2	do. tammy	1	8	0	3	4
4	shawls	7	6	1	10	0
				£.7	12	2

25 dols. 36 cts.

Portsmouth, 19th May, 1803.

Mr. THOMAS BARRINGTON

Bought of SIMON WILSON,

1¾ lb. Tea	4*s*.6	£.0	7 10½
4½ bushels corn	5*s*.4		
5 quarts brandy	8*s*.4 per gallon		
6 do. rum	7*s*.6 do.		
7¼ yards chintz	2*s*.5		
		£.3	11 0¾

11 dols. 84⅓ cts.

Salem, 23d May, 1803.

Mr. AMOS GILES

Bought of LEMUEL KING,

10 boys' coloured hats, No. 1,	at 4*s*.6	£.2	5	0
12 do.	2, .. 5*s*.			
4 do.	3, .. 5*s*.6			
4 do.	9, .. 10*s*.			
4 do.	10, .. 11*s*.			
6 do.	11, .. 12*s*.			
6 men's plain black do.	12, .. 14*s*.			
		£.18	7	0
Trunk		1	4	0
		£.19	11	0

65 dols. 16⅔ cts.

Mr. NATHAN PERKINS *Boston, 10th August,* 1803.
Bought of GEORGE ALLEN,

64½	yds. striped nankins	at	2*s.*	£.6	9 0
32	ells mode		3*s.*		
28½	yds. calico		2*s.*4		
2	groce gilt coat buttons		18*s.*6		
3	pieces russel		34*s.*		
				£.21	10 6

71 dols. 75 cts.

Mr. WILLIAM SANDS *Newburyport, Sept.* 10, 1803.
Bought of STEPHEN NOWLAN,

2	pieces muslin		30*s.*	£.3	0 0
25	yards Irish linen		2*s.*		
28⅝	do. stormount calico		2*s.*6		
28½	do. rod	do.	2*s.*2		
1	piece durant		56*s.*		
2	pieces blue shalloon		57*s.*6		
50½	yards dimity		2*s.*6		
3	pieces persian		84*s.*		
				£.39	12 3

132 dols. 4 cts.

Received payment by his note of the above date at three months.
For Stephen Nowlan,
ABRAHAM TRUSTY.

COMPOUND DIVISION

Teacheth to find how often one number is contained in another of different denominations.

EXAMPLES.

1. Divide £.19 14*s.* 9½*d.* by 2.

2)19 14 9½

Ans. £.9 17 4¾

2. Divide £.900 11 9¾, by 3. Ans. £.300 3 11¼
Prove this answer to be right.

3. Divide £.121 7*s.* 9¾*d.* by 5. Ans. £.24 5*s.* 6¾*d.*
4. Divide £.248 9*s.* 1½*d.* by 9. Ans. £.27 12*s.* 1½*d.*
5. Divide £.1057 1*s.* 3*d.* by 12. Ans. £.88 1*s.* 9¼*d.*

II. If the divisor exceeds 12, and it be found in the table, divide by its component parts.

EXAMPLES.

1. Divide £.278 8*s.* 9*d.* between 45 men equally.

5)278 8 9
9)55 13 9

Ans. £.6 3 9 each.

2. If 20 lb. of indigo cost £.7 5*s.* 10*d.* what is it per lb.?
Ans. 7*s.* 3½*d.*
3. If 24 yards of durant cost 62*s.* 6*d.* what is it per yard?
Ans. 2*s.* 7½*d.*
4. If 72 bushels of corn cost £.20 9*s.* 6*d.* what is it per bushel? Ans. 5*s.* 8½*d.*
5. If 108 lb. of tea cost £.45 13*s.* 6*d.* what is 1 lb. worth?
Ans. 8*s.* 5½*d.*
6. When £.166 13*s.* 4*d.* is paid for 500 gallons of rum, what is it per gallon? Ans. 6*s.* 8*d.*
7. If 1000 gallons of molasses cost £.209 7*s.* 6*d.* what is it per gallon? Ans. 4*s.* 2¼*d.*

III. If the divisor cannot be found by the multiplication of small numbers, as the preceding examples, divide by it as in the following

EXAMPLES.

1. Divide £.46 1*s.* 11*d.* by 37.

£. *s.* *d.*
37)46 1 11(1 4 11 Ans.
37
9
20
37)181(4
148
33
12
37)407(11
37
37
37

2. Divide £.33 13*s.* 8½*d.* by 23. Ans. £.1 9 3½.

3. If 345 quintals of fish cost £.409 13*s.* 9*d.* how much is it per quintal? Ans. 23*s.* 9*d.*

Dividing by fractional parts, as ½, ⅔, ¼, &c. is the same as multiplying by them. See the Rule under Case II. in compound multiplication.

1. How much is ¾ of £.91 11*s.* 3*d.*

91	11	3	Or thus	2)91	11	3	
		3					
				2)45	15	7½	one half the sum.
4)274	13	9			22	17	9¾ one quarter.
Ans. £.68	13	5¼		£.68	13	5¼	answer.

2. Divide £.126 19*s.* 5¾*d.* by ⅘. Ans. £.101 11 7

3. If the whole of a ship is worth £.960 what is ⅝ worth? Ans. £.600

4. If ⅝ of a ship was sold for £.1056 2*s.* 1*d.* what was the whole valued at? Ans. £.1689 15 4

IV. Having the price of a hundred weight, to know how much it is per pound.

Rule. Find the price of 1 or 2 quarters, and then divide by the component parts.

1. If 1 cwt. of steel cost £.4 6*s.* 4*d.* what is it per lb.?

4)4	6	4	Or thus	2)4	6	4	
4)1	1	7	price of 1 qr.	7)2	3	2	price of 2 quarters.
7)0	5	4¼		8)0	6	2	
Ans. 0	0	9¼	per lb.	0	0	9¼	per lb.

2. If 1 cwt. of flour cost 23*s.* 4*d.* what is it per lb.? Ans. 2½*d.*

3. When 2 cwt. of sugar cost £ 8 17*s.* 4*d.* what is it per lb.? Ans. 9½*d.*

4. If 5 cwt. of iron cost £8. 15*s.* 0*d.* how much is it per lb. Ans. 3¾*d.*

* * * * * *

1. A mate and 3 seamen have to receive 600 dollars, for recapturing their vessel, of which the mate is to have two shares, and each seaman one share; how much is the part of each? Ans.—The mate's part is 240 dols. and each seaman's 120.

2. Capt. M. of the Jason, meets at sea with the wreck of the Hawk, of Boston, from which he takes sundry articles, which sell for 521 dollars 64 cents: two-thirds of this sum is awarded to the owners of the Hawk; of the other $\frac{1}{3}$, the owners of the Jason are to have $\frac{1}{2}$, and the remainder is to be divided between the captain, mate, and nine seamen, allowing the captain 3 shares, the mate 2, and the seamen 1 share each; what is the respective part of those concerned?

	dols.	*cts.*
Ans.—The owners of the Hawk	347	76
owners of the Jason	86	94
captain	18	63
mate	12	42
each seaman	6	21

DECIMAL FRACTIONS.

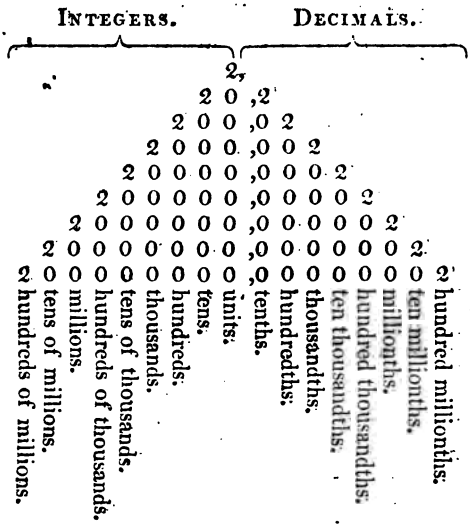
A DECIMAL FRACTION is that, whose denominator is an unit, with as many cyphers annexed to it as the numerator has places, and is usually expressed by writing the numerator only, with a point before it called the separatrix; thus, $\frac{5}{10}$, $\frac{25}{100}$, $\frac{125}{1000}$, are decimal fractions, and are expressed by ,5 ,25 ,125 respectively.

The figures to the left hand of the separatrix are whole numbers; thus 4,5 yards is 4 yards and 5 tenths, or one half of another yard.

Cyphers placed to the right hand of decimals, make no alteration in their value; for ,5 ,50 ,500 &c. are decimals of the same value, being each equal to $\frac{1}{2}$; but when placed to the left hand, the value of the fraction is decreased in a tenfold proportion; thus ,5 ,05 ,005 &c. are 5 tenth parts, 5 hundredth parts, 5 thousandth parts, respectively.

The different value of figures will appear plainer by the following

TABLE.



From this table it appears, that as whole numbers increase in a tenfold proportion from units to the left hand, so decimals decrease in the same proportion to the right,—and that in decimals, as in whole numbers, the place of a figure determines its relative value.

ADDITION OF DECIMALS.

RULE. Place the given numbers so that the decimal points may stand directly under each other, then add as in whole numbers, and point off so many places for decimals to the right as are equal to the greatest number of the decimal places in any of the given numbers.

EXAMPLES.

263,51	42,23	2,1
149,28	18,47	,5
293,53	9,2	26,17
184,59	52,984	,7
129,4	2,1	5,
1020,31	124,484	34,47

3. What will 27 cwt. of iron come to at 4 dollars 56 cents per cwt. ? Ans. 123 dols. 12 cents.

4. How much will 281 yards of tape come to at 9 mills per yard ? Ans. 2 dols. 52 cents 9 mills.

5. What will 371 yards of broadcloth come to at 5 dols. 79 cents per yard ? Ans. 2148 dols. 9 cents.

6. How much will 29½ yards of mode come to at 75 cents per yard ? Ans. 22 dols. 12 cents 5 mills.

7. What will 23,625 feet of boards come to at 8 dollars 25 cents per M. ?

23,625
8,25

118125
47250
189000

194,90625 Ans. 194 dols. 90 cents 6 mills.

8. How much will 712 feet of boards come to at 14 dollars per thousand ? Ans. 9 dols. 96 cents 8 mills.

9. What will 25,650 feet of clear boards came to at 17 dols. 50 cents per thousand ? Ans. 448 dols. 87 cents 5 mills.

			Dols.	*Cts.*		*Dols.*	*Cts.*	*M.*
10.	15,859	feet clear boards	17	50	per M.	277	53	2
11.	812	do.	14			11	36	8
12.	376	do.	12	75		4	79	4
13.	31,496	merchantable do.	8			251	96	8
14.	269	do.	6	75		1	81	5
15.	4,114	refuse do.	3	37		13	86	4
16.	393	maple do.		8	per foot	31	44	
17.	57	mahogany		32	do.	18	24	
18.	195	gallons molasses		57	per gall.	111	15	
19.	189	do. rum		93		175	77	
20.	243	yards baize		23	per yard	55	89	
21.	197	feet clear boards		2	per foot	3	94	

DIVISION OF DECIMALS.

RULE. Divide as in whole numbers, and from the right hand of the quotient point off as many places for decimals as the decimal places in the dividend exceed those of the divisor. If the places of the quotient are not so many as the rule requires, supply the defect by prefixing cyphers. If at any time *there be a remainder*, or the decimal [illegible] in the divisor are

more than those in the dividend, cyphers may be annexed to the dividend, and the quotient carried to any degree of exactness.

EXAMPLES.

92),863972(,009391		,853)89,000	(104,337, &c.
828		853	
359		3700	
276		3412	
837		2880	
828		2559	
92		3210	
92		2559	
		6510	
		5971	
		539	

The various kinds that ever occur in division are included in the following cases, viz.

Divide ,803	by ,22	Ans. 3,65
,803	2,2	,365
,803	22	,0365
80,3	,22	365
80,3	2,2	36,5
80,3	22	3,65
222	,365	608,21+
222	3,65	60,821+
222	365	,60821+

As multiplying by 10, 100, 1000, &c. is only removing the separating point of the multiplicand so many places to the right hand as there are cyphers in the multiplier, so to divide by the same, is only removing the separatrix, in the same manner, to the left.

PRACTICAL QUESTIONS.

[illegible]

[illegible]

In this example as the divisor is a whole number, three places are pointed off in the quotient, to equal those in the dividend.

[illegible] If 493 yards cost 4 dols. 43 cents 7 mills, what is it per yard? Ans. 9 mills.

[illegible] If 125 gallons of molasses cost 95 dollars, what is 1 gallon worth? Ans. 76 cents.

[illegible] If 205 yards of [illegible] cost 107 dollars 62½ cents, what is it per yard? Ans. 52½ cents.

REDUCTION OF DECIMALS.

Case I.

To reduce a vulgar fraction to its equivalent decimal.

Rule. Divide the numerator by the denominator, and the quotient will be the decimal required.

Examples.

1. Reduce $\frac{3}{4}$ to a decimal.

4)3,00

Ans. ,75

2. What is the decimal of $\frac{1}{2}$? Ans. ,5
3. What is the decimal of $\frac{1}{4}$? Ans. ,25
4. What is the decimal of $\frac{3}{20}$? Ans. ,15
5. What is the decimal of $\frac{17}{25}$? Ans. ,68
6. Express $\frac{7}{8}$ decimally. Ans. ,875

Case II.

To reduce numbers of different denominations to their equivalent decimal values.

Rule. 1. Write the given numbers perpendicularly under one another for dividends, proceeding orderly from the least to the greatest.

2. Opposite to each dividend, on the left hand, place such a number for a divisor as will bring it to the next superior name, and draw a line between them.

3. Begin with the highest, and write the quotient of each division, as decimal parts, on the right hand of the dividend next below it, and the last quotient will be the decimal sought.

Examples.

1. Reduce 14*s*. 5½*d*. to the decimal of a pound.

4	2
12	5,5
20	14,4583

Ans. ,7229

2. Reduce 15 shillings to the decimal of a pound. Ans. ,75
3. Reduce 3 qrs. 18 lb. to the decimal of a cwt.

Ans. ,910714+

ce 2 qrs. 2 nails to the decimal of a yard. Ans. ,625

14 gals. 3 quarts to the decimal of a hogshead.

Ans. ,2341

Case III.

To find the decimal of any number of shillings, pence and farthings, by inspection.

Rule. Write half the greatest even number of shillings for the first decimal figure, and let the farthings, in the given pence and farthings, possess the second and third places; observing to increase the second place by 5, if the shillings be odd, and the third place by 1, when the farthings exceed 12, and by 2 when they exceed 37.

Examples.

1. Find the decimal of 13*s.* 9¾*d.* by inspection.

,6	half of 12*s.*
5	for the odd shilling
39	farthings in 9¾*d.*
2	for excess of 37
,691	

2. Find by inspection the decimal of 15*s.* 8¼*d.* 9*s.* 3½*d.* 19*s.* 6¾*d.* 3*s.* 6*d.* and 2*s.* 11½*d.* Ans. ,784 ,465 ,978 ,175 ,148.

Case IV.

To find the value of any given decimal in the terms of the integer.

Rule. 1. Multiply the decimal by the number of parts in the next less denomination, and cut off as many places for the remainder to the right hand as there are places in the given decimal.

2. Multiply the remainder by the parts in the next inferior denomination, and cut off a remainder as before.

3. Proceed in this manner through all the parts of the integer, and the several denominations, standing on the left hand, make the answer.

Examples.

1. Find the value of ,691 of a pound.

,691	
20	
13,820	
12	
9,840	
4	
3,360	Ans. 13*s.* 9¾*d.*

2. What is the value of ,9 of a shilling? Ans. 10¾*d.*
3. What is the value of ,592 of a cwt.?
Ans. 2 qrs. 10 lb. 4 oz. 13+drs.
4. What is the value of ,258 of a tun of wine?
Ans. 1 hhd. 2+galls.
5. What is the value of ,12785 of a year?
Ans. 46 days 15 hours [illegible]es 57+sec.

TABLE I.

ENGLISH COIN.

1*l.* the Integer.

Sh.	*dec.*	*Sh.*	*dec.*
19	,95	9	,45
18	,9	8	,4
17	,85	7	,35
16	,8	6	,3
15	,75	5	,25
14	,7	4	,2
13	,65	3	,15
12	,6	2	,1
11	,55	1	,05
10	,5		

Pence.	*Decimals.*
6	,025
5	,020833
4	,016666
3	,0125
2	,008333
1	,004166

Farth.	*Decimals.*
3	,003125
2	,0020833
1	,0010416

TABLE II.

ENG. COIN. 1 *Shill.*

LONG MEAS. 1 *Foot.*

The Integer.

Pence. and *Inches.*	*Decimals.*
6	,5
5	,416666
4	,333333
3	,25
2	,166666
1	,083333

Farth.	*Decimals.*
3	,0625
2	,041666
1	,020833

TABLE III.

TROY WEIGHT.

1 *lb.* the Integer.

Ounces the same as Pence in the last Table.

Penny weight.	*Decimals.*
10	,041666
9	,0375
8	,033333
7	,029166
6	,025
5	,020833
4	,016666
3	,0125
2	,008333
1	,004166

Grains.	*Decimals.*
12	,002083
11	,001910
10	,001736
9	,001562
8	,001389
7	,001215
6	,001042
5	,000868
4	,000694
3	,000521
2	,000347
1	,000173

1 *oz.* the Integer.

Pennyweight the same as Shillings in the first Table.

Grains.	*Decimals.*
12	,025
11	,022916
10	,020833
9	,01875
8	,016666
7	,014583
6	,0125
5	,010416
4	,008333
3	,00625
2	,004166
1	,002083

TABLE IV.

AVOIRDUPOIS WT.

112 *lb.* the Integer.

Qrs.	*Decimals.*
3	,75
2	,5
1	,25

Pounds	*Decimals.*
14	,125
13	,116071
12	,107143
11	,098214
10	,089286
9	,080357
8	,071428
7	,0625
6	,053571
5	,044643
4	,035714
3	,026786
2	,017857
1	,008928

Ounces	*Decimals.*
8	,004464
7	,003906
6	,003348
5	,002790
4	,002232
3	,001674
2	,001116
1	,000558

¼ *Oz.*	*Decimals.*
3	,000418
2	,000279
1	,000139

Decimal Tables of CORN, WEIGHT and MEASURE.

TABLE V.

[illegible] the Integer.

Qts.	Decimals.
3	[illegible]
2	[illegible]
1	[illegible]

Pints.	Decimals.
7	,007843
6	,023437
5	,019531
4	,015625
3	,011718
2	,007812
1	,003906

TABLE VI.

LIQUID MEASURE.

1 *Tun* the Integer.

Gals.	*Decimals.*
100	,396825
90	,357141
80	,317460
70	,27
60	,238095
50	,198412
40	,158730
30	,119047
20	,079365
10	,039682
9	,035714
8	,031746
7	,027
6	,023809

Gals.	Decimals.
5	,019841
4	,015873
3	,011904
2	,007936
1	,003968

Pints.	Decimals.
4	,001984
3	,001488
2	,000992
1	,000496

A Hogshead the Integer.

Gals.	Decimals.
30	,476190
20	,317460
10	,158730
9	,142857
8	,126984
7	,111111
6	,095238
5	,079365
4	,063492
3	,047619
2	,031746
1	,015873

Pints.	*Decimals.*
3	,005952
2	,003968
1	,001684

TABLE VII.

MEASURE.

Liquid. 1 *Gallon.* *Dry.* 1 *Quarter.*

Integer.

Pt.	*Decim.*	*Bu.*
4	,5	4
3	,375	3
2	,25	2
1	,125	1

Q.pt.	*Decim.*	*Pk.*
3	,09375	3
2	,0625	2
1	,03125	1

Decimals.	*Q.pts.*
,0234375	3
,015625	2
,0078125	1

Decimals.	*Pts.*
,005859	3
,003906	2
,001953	1

TABLE VIII.

LONG MEASURE.

1 *Mile* the Integer.

Yards.	*Decimals.*
1000	,568182
900	,511364
800	,454545
700	,397727
600	,340909
500	,284091
400	,227272
300	,170454
200	,113636
100	,056818
90	,051136
80	,045454
70	,039773
60	,034091
50	,028409
40	,022727
30	,017045
20	,011364
10	,005682
9	,005114

Yards.	Decimals.
8	,004545
7	,003977
6	,003409
5	,002841
4	,002273
3	,001704
2	,001139
1	,000568

Feet.	Decimals.
2	,0003787
1	,0001894

Inches.	Decimals.
6	,0000947
5	,000079
4	,0000631
3	,0000474
2	,0000319
1	,0000158

TABLE IX.

TIME.

1 *Year* the Integer.

Months the same as Pence in the second Table.

Days.	Decimals.
365	1,000000
300	,821918
200	,547945
100	,273973
90	,246575
80	,219178
70	,191781
60	,164383
50	,136986
40	,109589
30	,082192
20	,054794
10	,027397
9	,024657

Days.	Decimals.
8	,021918
7	,019178
6	,016438
5	,013698
4	,010959
3	,008219
2	,005479
1	,002739

1 *Day* the Integer.

Hours.	Decimals.
12	,5
11	,458333
10	,416666
9	,375
8	,333333
7	,291666
6	,25
5	,208333
4	,166666
3	,125
2	,083333
1	,041666

Minutes.	Decimals.
30	,020833
20	,013888
10	,006944
9	,00625
8	,005555
7	,004861
6	,004166
5	,003472
4	,002777
3	,002083
2	,001388
1	,000694

TABLE X.

CLOTH MEASURE.

1 *Yard* the Integer.

Quarters the same as Table IV.

Nails.	Decimals.
2	,125
1	,0625

TABLE XI.

LEAD WEIGHT.

1 *Fother* the Integer.

Hund.	Decimals.
10	,512820
9	,461538
8	,410256
7	,358974
6	,307692
5	,256410
4	,205128
3	,153846
2	,102564
1	,051282

Qrs.	Decimals.
2	,025641
1	,012820

Pounds.	Decimals.
14	,0064102
13	,0059523
12	,0054945
11	,0050366
10	,0045787
9	,0041208
8	,0036630
7	,0032051
6	,0027472
5	,0022893
4	,0018315
3	,0013736
2	,0009157
1	,0004578

The Single Rule of Three Direct.

The Single Rule of Three Direct teaches, from three numbers given, to find a fourth, and which shall have the same proportion to the third as the second has to the first.

Rule. 1. Make the number that is the demand of the question the third term, the number that is of the same name of quality the first term, and the remaining number will be the second term.

Perform the first and third numbers with the same, and the second number to several denomination mentioned.

2. Multiply the second and third numbers together, and divide the product by the first, and the quotient will be the answer, or if there be no remainder, is the answer required.

If after division, there be a remainder, reduce it to the next denomination below that to which the second number was reduced, and divide by the same divisor as before, and the quotient will be of this last denomination. Proceed thus with all the remainders till you have reduced them to the lowest denomination, which the second number admits of, and the several quotients taken together will be the answer required.

The method of proof is by reversing the question.

Examples.

1. If 2 yards of cloth cost 4 shillings, what will 125 yards come to?

yds.	*s.*	*yds.*
If 2	4 : :	125
		4
		2)500
		20)250
Ans.	£.12	10

Proof if

yds.	£.	*s.*	*yds.*
125 :	12	10 : :	2
		20	
		250	
		2	

125)500(4 shillings.
500

2. If 1 bushel of corn cost 75 cents, what will 257 bushels come to ?

bush.	*cts.*	*bush.*
If 1	: 75	: : 257
		75
		1285
		1799
		192,75 Ans. 192 dols. 75 cts.

3. What will 931 yards of shalloon come to at 55 cts. 4 ms. per yard ? Ans. 515 dols. 77 cts. 4 ms.

4. How many bushels of wheat at 1 dol. 12 cts. per bushel can I have for 81 dols. 76 cts. ? Ans. 73 bushels.

5. What will 94 cwt. of iron come to at 4 dols. 97 cts. 2 ms. per cwt. ? Ans. 467 dols. 36 cts. 8 ms.

6. What will 349 lbs. of beef come to at 2*d*. per pound ?
Ans. £.2 18 2.

7. At 3*s*. per yard what will 59 yards of cloth come to ?
Ans. £.8 17 0.

Prove this answer to be right.

8. How many lbs. of beef at 5 cts. per lb. may be bought for 29 dols. 85 cts. ?

cts.	*lb.*	*dols. cts.*
If 5	: 1	:: 29,85
		1
		,05)29,85
		597 Ans. 597 lb.

9. How many hogsheads of salt at 4 dols. 90 cts. per hhd. can I have for 392 dols. ? Ans. 80 hhds.

10. How many lbs. of coffee, at 1*s*. 7*d*. per lb. may be bought for £.8 12 7 ? Ans. 109 lb.

11. When 25 yards of cloth cost £.2 12s. 1d. what is it per yard?

yd. *£.* *s.* *d.* *yd.*
If 25 : 2 12 1 :: 1

20

52
12

625
1

25)625(12 | 25

50 2s. 1d.

125
125

Ans. 2s. 1d.

12. If 56 bushels of corn cost 42 dols. 56 cts. what is it per bushel?

bush. *dols.cts.* *bush.*
If 56 : 42,56 :: 1

1

56)42,56(,76
392

336
336

Ans. 76 cts.

13. If 112 pounds of beef cost 18s. 8d. what is it per lb.?
Ans. 2 pence.

14. If 678 bushels of rye cost 769 dols. 23 cts. 9 mills, what is one bushel worth? Ans. 1 dol. 14 cts. 3 mills.

15. What is one yard of baize worth, when 97 yards cost £.10 12s. 2¼d.? Ans. 2s. 2¼d.

16. When iron is sold at 5 dols. 4 cts. per cwt. what is it per pound? Ans. 4 cts. 5 m.

17. If 891 gallons of molasses cost £.176 6s. 10½d. what is it per gallon? Ans. 3s. 11½d.
Prove this answer to be right.

18. What will 253 quintals of fish come to, at 17s. 6d. per quintal? Ans. £.221 7 6

19. At 5 dols. 50 cts. per thousand, what will 37 thousand of boards come to ? Ans. 203 dols. 50 cts.

20. What will 4 hhds. of rum come to, containing viz. 79½, 84, 101½, and 112 gallons, at 6*s*. 9*d*. per gallon ?
Ans. £.127 4 9.

21. What will 327 hhds. of salt come to, at 5 dollars 25 cents per hhd. ? Ans. 1716 dols. 75 cents.

22. If 3 and 4 make 9, how many will 6 and 8 make ?
Ans. 18.

23. If a chest of Hyson tea, weighing 79 lb. neat, cost £.32 11*s*. 9*d*. what is it per lb. ? Ans. 8*s*. 3*d*.

24. B owes £2119 17*s*. 6*d*. and he is worth but £.1324 18*s*. 5¼*d*. ; if he delivers this to his creditors, how much do they receive on the pound ? Ans. 12*s*. 6*d*.

25. A owes B £.569 6*s*. 8*d*. but failing in trade, he is able to pay but 15*s*. 6*d*. on the pound ; how much is B to receive, and what is his loss ? Ans.—He is to receive £.441 4 8
His loss is 128 2 0

26. A merchant failing in trade, owes in all 29475 dollars, and delivers up his whole property, worth 21894 dolls. 3 cents; how much per cent. does he pay, and what is B's loss, to whom he owed 325 dollars ?
Ans.—He pays 74 dols. 28 cts. per cent.
And B loses 83 dols. 59 cents.

27. How much will 4 cwt. 1 qr. 19 lb. of butter come, at 9*d*. per lb. ?

lb.
400 = 4 hundred.
48 = excess, 12 per cent.
28 = 1 quarter.
19

lb. *d.*
If 1 : 9 :: 495
9
12)4455
20)371 3
Ans. £.18 11*s*. 3*d*.

28. If 3 qrs. 26 lb. of steel cost 13 dols. 20 cts. what is it per pound ? Ans. 12 cents.

52. What will 19 M. 8 and 15 casts of white oak hhd. staves come to, at 31 dols. per M. ?

Ans. 614 dols. 96 cts. 2 ms.

53. What will 22 M. 9 and 37 casts of red oak hhd. staves come to, at 13 dols. per M. ? Ans. 298 dols. 90 cts. 2 ms.

54. What will 56 bundles of hoops come to at 25 dols. per M. of 30 bundles ?

NOTE. Hoops are sometimes bound in bundles of 30 hoops each, and four such bundles are 1 hundred, and 10 hundred or 40 bundles, 1 thousand. But they are generally bound in bundles of 40 each, 3 bundles making 1 hundred, and 10 hundred or 30 bundles, 1 thousand.

3)56

hund. *dols.* Or *bund.* *dols.* *lund.*

If 10 : 25 : : $18\frac{2}{3}$ hundreds 30 : 25 : : 56

25 25

90 280

36 112

$16\frac{2}{3}$

3'0)140|0

10)46|$6\frac{2}{3}$

$46,6\frac{2}{3}$

Ans. 46 dols. $6\frac{2}{3}$ dimes, or $66\frac{2}{3}$ cts.

55. How many bushels of salt, at 4 dols. 75 cents per hhd. can I have for 326 dollars ?

dls. cts. *bush.* *dols.*

If 4,75 : 8 : : 326 Ans. 549 bushels, when measured on board the vessel.

If 4 75 : $7\frac{1}{2}$: : 326 Ans. 514 bushels three pecks, nearly, when measured ashore.

56. What is the tax on lands, &c. valued at 2957 dollars, in the direct tax, at 28 cents and 3 mills on the hundred dollars ? Ans. 8 dols. 36 cts. 8 m.

57. What is the tax on a house, valued at 900 dollars, in the direct tax, at $\frac{3}{10}$ per cent. ?

dols. *dols.* *dols.*

If 100 : ,3 : : 900

,3

100)270,0

Ans. 2 dols. 70 cts.

Or, As $\frac{3}{10}$ per cent. is equal to 3 mills on the dollar, *multiplying* the sum in dollars by 3, gives the answer in mills.

3. How much will a grindstone, 32 inches diameter, and 4 inches thick, come to, at 5*s.* per cubic foot?

See Reduction, cubic measure.

32 the diameter.
16 = half the diameter.

48
16
288
48
768
6

inch.	*s.*			*s.*	*d.*	
If 1728	: 5	: :	4608	: 13	4	Ans. 13*s.* 4*d.*

4. What will a grindstone, 28 inches diameter, and 5½ inches thick, come to, at 1 dol. 90 cts. per cubic foot?

Ans. 2 dols. 26 cts.

5. When a man's yearly income is 949 dollars, how much per day? Ans. 2 dols. 60 cts.

6. At 4½ per cent, what is the commission on 1525 dols.?

Ans. 68 dols. 62 cts. 5 mills.

7. What is the interest of 456 dols. for 1 year, at 6 per cent? Ans. 27 dols. 36 cents.

8. At 5 dolls. 50 cts. per M. what will 21,186 feet boards come to? Ans. 116 dols. 52 cts. 3 m.

9. When boards are sold at 18 dols. per M. what is it per foot? Ans. 1 cent, 8 mills.

10. What will 98 feet of boards come to at 4 cents per foot? Ans. 3 dols. 92 cents.

11. What will 49 thousand 3 hundred and 25 casts of staves come to at 17 dollars per thousand?

NOTE. Staves are counted by casting three at a time; 40 casts make 1 hundred, and 10 hundred 1 thousand.

	M.	*dols.*		*M.*	*h.*	*c.*	
If	1	: 17	: :	49	3	25	
	10			10			
	10			493			
	40			40			
Casts	400			19745			*dols. cts. m.* Ans. 839 16 5

52. What will 19 M. 8 and 15 casts of white oak hhd. staves come to, at 31 dols. per M. ?

Ans. 614 dols. 96 cts. 2 ms.

53. What will 22 M. 9 and 37 casts of red oak hhd. staves come to, at 13 dols. per M. ? Ans. 298 dols. 90 cts. 2 ms.

54. What will 56 bundles of hoops come to at 25 dols. per M. of 30 bundles ?

Note. Hoops are sometimes bound in bundles of 30 hoops each, and 33 such bundles are 1 hundred, and 10 hundred or 40 bundles, 1 thousand. But they are generally bound in bundles of 40 each, 3 bundles making 1 hundred, and 10 hundred or 30 bundles, 1 thousand.

$1.56

bund.	*dols.*			Or *bund.*	*dols.*	*bund.*
If 30	25	::	$18\frac{2}{3}$ hundreds	30	25	:: 56
			25			25
			90			280
			36			112
			$16\frac{2}{3}$			
						30)140|0
			10 46|$6\frac{2}{3}$			46,$66\frac{2}{3}$
			46,$6\frac{2}{3}$			

Ans. 46 dols. $6\frac{2}{3}$ dimes, or $66\frac{2}{3}$ cts.

55. How many bushels of salt, at 4 dols. 75 cents per hhd. can I have for 320 dollars ?

dols.	*bush.*	*dols.*		
If 4,75	: 8	:: 320	Ans.	549 bushels, when measured on board the vessel.
If 4,75	: $7\frac{1}{2}$	:: 320	Ans.	514 bushels three pecks, nearly, when measured ashore.

56. What is the tax on lands, &c. valued at 2957 dollars, in the direct tax, at 28 cents and 3 mills on the hundred dollars ? Ans. 8 dols. 36 cts. 8 m.

57. What is the tax on a house, valued at 900 dollars, in the direct tax, at $\frac{3}{10}$ per cent. ?

dols.		*dols.*		*dols.*
If 100	:	,3	::	900
				,3
				100)270,0

Ans. 2 dols. 70 cts.

Or, As $\frac{3}{10}$ per cent. is equal to 3 mills on the dollar, mul*tiplying the* sum in dollars by 3, gives in mills.

EXAMPLE.

58. What is the tax on 753 dollars at $\frac{3}{10}$ per cent.?

753 dollars
3 mills

2259 mills. Ans. 2 dols. 25 cts. 9 m.

59. Find the tax on the following sums—

	dols.		dols. cts.
viz.	1550	at $\frac{4}{10}$ per cent.	Ans. 6 20
	4560	$\frac{5}{10}$	22 80
	7850	$\frac{6}{10}$	47 10
	12680	$\frac{7}{10}$	88 76
	16950	$\frac{8}{10}$	135 60
	24620	$\frac{9}{10}$	221 58
	35840	1	358 40

60. What will a piece of land, measuring 48 feet in length and 40 feet in width at each end, amount to at 20 dols. per square rod?

feet.
48
feet. *dols.* 40

If 272¼ : 20 :: 1920

By decimals. Ans. 141 dols. 4 cts.

If 272,25 : 20 : : 1920.

61. A charter-party for a vessel of 186 tons commenced on 28th of May, and ended on the 10th of October following: What does the hire amount to for that time, at 2 dols. per ton per month of 30 days?

	days.
May	4
June	30
July	31
August	31
September ..	30
October	10
	136

186 tons.
2 dols. per mo.

days.
If 30 : 372 : : 136
136

2232
1116
372

30)50592

1686,40 Ans. 1686 dols. 40 cts.

In calculating the time, the days of receiving and discharging the vessel are both included.

3. If a family of 9 persons spend 450 dollars in 5 mont how much would be sufficient to maintain them 8 months five more were added to the family? Ans. 1120 dollars

4. What is the interest of £.240 for 50 days, at 5 per ce per annum?

£.		days.		£.
100	:	365	: :	5
240	:	50		
50				

100 12000
365 5

365|00)600|00(1 12 10½
365
235
20

365)4700(12
4380
320
12

365)3840(10
3650
190
4

365)760(2
730
30

Ans. £.1 12 10½

N. B. By omitting to multiply by the rate per cent. and divid 36500 by it, are found the fixed divisors of 7300 for 5, and 6083 for 6 cent. per annum, sometimes used in calculating interest.

5. What is the interest of 654 dollars for 164 days, at 6 per cent. per annum?

100
365
6)36500
6083 the fixed divisor, found as above directed.

654 dollars.
164
2616
3924
654
6083)107256(17,632
6083
46426
42581
38450
36498
19520
18249
12710
12166
544

ans. 17d. 63c. 2m.

6. What is the interest of 947 dollars, for 294 days, at 5 per cent. per annum?

947 *dols.*
294
3788
8523
1894
Fixed divisor 7300)278418(38,139
21900
59418
58400
10180
7300
28800
21900
69000
65700
3300

Ans. 38 dols. 13 cts. 9

VULGAR FRACTIONS.

FRACTIONS, or broken numbers, are expressions for any assignable parts of an unit; and are represented by two numbers, placed one above the other, with a line drawn between them.

The number above the line is called the *numerator*, and that below the line the *denominator*.

The denominator shews how many parts the integer is divided into, and the numerator shews how many of those parts are meant by the fraction.

Fractions are either proper, improper, compound, or mixed.

1st. A *proper fraction* is when the numerator is less than the denominator, as $\frac{1}{2}$, $\frac{2}{3}$, $\frac{5}{11}$, $\frac{53}{70}$, &c.

2d. An *improper fraction* is when the numerator is either equal to or greater than the denominator, as $\frac{8}{8}$, $\frac{11}{9}$, $\frac{18}{12}$, $\frac{35}{20}$, &c.

3d. A *compound fraction* is a fraction of fractions, and known by the word *of*, as $\frac{1}{2}$ of $\frac{2}{3}$, $\frac{7}{8}$ of $\frac{9}{10}$, $\frac{15}{16}$ of $\frac{21}{28}$, &c.

4th. A *mixed number* or *fraction* is composed of a whole number and fraction, as $8\frac{9}{11}$. $17\frac{1}{2}$, $29\frac{3}{4}$, &c.

I. *To reduce a simple fraction to its lowest terms.*

RULE. Find a common measure by dividing the lower term by the upper, and that divisor by the remainder, continuing till nothing remains; the last divisor is the common measure; then divide both parts of the fraction by the common measure, the quotients express the fraction required.

NOTE. If the common measure happens to be 1, the fraction is already in its lowest term; and when a fraction hath cyphers at the right hand, it may be abbreviated by cutting them off, as $\frac{4}{5}\frac{8}{0}$.

EXAMPLES.

1. Reduce $\frac{91}{117}$ to its lowest term.

91)117(1
91
26)91(3
78
13)26(2
26

Common measure 13)$\frac{91}{117}$($\frac{7}{9}$ the answer.

Or, divide the terms of the fraction by any number that will divide them without a remainder; divide the quotients in the same manner, and so on, till no number will divide them both; and the last quotients express the fraction in its lowest terms.

EXAMPLES.

2. Reduce $\frac{192}{576}$ to its lowest terms.

(2) (8) (3)
192 24 3 1
——=——=—=— the answer.
576 72 9 3

3. Reduce $\frac{144}{216}$ to its lowest terms. Ans. $\frac{2}{3}$.
4. Reduce $\frac{114}{285}$ to its lowest terms. Ans. $\frac{2}{5}$.
5. Reduce $\frac{1612}{6454}$ to its lowest terms. Ans. $\frac{14}{57}$.

II. *To reduce a mixt number to an improper fraction.*

RULE. Multiply the whole numbers by the denominator of the fraction, and to the product add the numerator for a new numerator, and place it over the denominator.

NOTE. To express a whole number fraction-wise, set 1 for a denominator to the given number.

EXAMPLES.

1. Reduce $5\frac{3}{8}$ to an improper fraction.
$5\times 8+3=\frac{43}{8}$ the answer.
2. Reduce $183\frac{5}{11}$ to an improper fraction. Ans. $\frac{2018}{11}$.
3. Reduce $27\frac{3}{9}$ to an improper fraction. Ans. $\frac{246}{9}$.
4. Reduce $514\frac{5}{16}$ to an improper fraction. Ans. $\frac{8229}{16}$.

III. *To reduce an improper fraction to its proper terms.*

RULE. Divide the upper term by the lower, and the quotient will be the whole number; the remainder, if any, will be the numerator to the fractional part.

EXAMPLES.

1. Reduce $\frac{17}{5}$ to its proper terms.
5)17($3\frac{2}{5}$ the answer.
15
—
2
2. Reduce $2\frac{48}{9}$ to its proper terms. Ans. $27\frac{3}{9}$.
3. Reduce $8\frac{229}{16}$ to its proper terms. Ans. $514\frac{5}{16}$.

IV. *To find the least common multiple or denominator.*

RULE. Divide the given denominators by any number that will divide two or more of them without a remainder, and set the quotients and the undivided numbers underneath. Divide these quotients and undivided numbers by any number that will divide two or more of them as before, and thus continue, till no two numbers are left capable of being lessened.

Multiply the last quotients and the divisor or divisors together, and the product will be the least common denominator required.

EXAMPLES.

1. What is the least common measure of $\frac{5}{9}$, $\frac{7}{8}$, $\frac{6}{15}$, $\frac{4}{16}$?

8)9 8 15 16

3)9 1 15 2

3 1 5 2

$3\times5\times2=30\times3\times8=720$ ans.

2. What is the least number that can be divided by the nine digits without a remainder? Ans. 2520.

V. *To reduce vulgar fractions to a common denominator.*

RULE. Find a common denominator by the last case, in which divide each particular denominator, and multiply the quotient by its own numerator, for a new numerator, and the new numerators, being placed over the common denominator, express the fractions required in their lowest terms.

EXAMPLES.

1. Reduce $\frac{3}{4}$, $\frac{5}{9}$ and $\frac{7}{12}$ to a common denominator.

36 the com. denom.

4	$9\times3=27$
9	$4\times5=20$
12	$3\times7=21$

The fractions will be $\frac{27}{36}$, $\frac{20}{36}$, $\frac{21}{36}$.

2. Reduce $\frac{1}{2}$, $\frac{2}{3}$, $\frac{5}{6}$ and $\frac{7}{8}$ to a common denominator.

Ans. $\frac{12}{24}$, $\frac{16}{24}$, $\frac{20}{24}$ *and* $\frac{21}{24}$.

3. *Reduce* $\frac{2}{5}$, $\frac{4}{9}$, $\frac{3}{7}$ and $\frac{5}{11}$ to a common denominator.

Ans. $\frac{22}{385}$, $\frac{280}{385}$, $\frac{165}{385}$ and $\frac{175}{385}$.

4. Reduce $\frac{1}{3}$, $\frac{3}{5}$, $\frac{4}{15}$ and $\frac{5}{8}$ to a common denominator.
Ans. $\frac{14}{15}$, $\frac{17}{15}$, $\frac{14}{15}$ and $\frac{15}{15}$.

VI. *To reduce a compound fraction to a single one.*

RULE. Multiply all the numerators for a new numerator, and all the denominators for a new denominator, then reduce the new fraction to its lowest term by Case I.

EXAMPLES.

1. Reduce $\frac{3}{4}$ of $\frac{5}{6}$ of $\frac{9}{10}$ to a single fraction.
$3\times5\times\ 9=135\quad 9$,
$4\times6\times10=240\quad 16$ the answer.
2. Reduce $\frac{5}{9}$ of $\frac{7}{8}$ of $\frac{11}{12}$ to a single fraction. Ans. $\frac{55}{189}$.
3. Reduce $\frac{2}{7}$ of $\frac{5}{8}$ of $\frac{4}{5}$ to a single fraction. Ans. $\frac{8}{63}$.

VII. *To reduce a fraction of one denomination to the fraction of another, but greater, retaining the same value.*

RULE. Reduce the given fraction to a compound one, by multiplying it with all the denominations between it and that denomination, to which you would reduce it; then reduce that compound fraction to a single one.

EXAMPLES.

1. Reduce $\frac{7}{8}$ of a penny to the fraction of a pound.
$$\frac{d.}{\frac{7\times1\times1}{8\times12\times20}=\frac{7}{1920}}$$ the answer.
2. Reduce $\frac{4}{5}$ of a pennyweight to the fraction of a pound Troy. Ans. $\frac{1}{300}$.
3. Reduce $\frac{4}{7}$ of a pound Avoirdupois to the fraction of a cwt. Ans. $\frac{1}{196}$.

VIII. *To reduce the fraction of one denomination to the fraction of another, but less, retaining the same value.*

RULE. Multiply the numerator by the parts contained in the several denominations between it and that denomination to which you would reduce it for a new numerator, and place it over the denominator of the given fraction.

EXAMPLES.

1. Reduce $\frac{1}{960}$ of a pound to the fraction of a penny.
$1\times20\times12=240$
$\frac{}{960}=\frac{1}{4}$ the answer.

2. Reduce $_{3}\frac{1}{20}$ of a lb. troy to the fraction of a dwt.
Ans. $\frac{1}{5}$.

3. Reduce $_{1}\frac{1}{16}$ of a cwt. to the fraction of a lb. Ans. $\frac{1}{7}$.

IX. *To find the value of the fraction in the known parts of the integer.*

RULE. Multiply the numerator by the known parts of the integer and divide by the denominator.

EXAMPLES.

1. What is the value of $\frac{2}{3}$ of a £.?

2
20 shillings.

3)40

Ans. 13*s.* 4*d.*

2. What is the value of $\frac{4}{5}$ of a shilling?
Ans. 4*d.* 3 qrs. $\frac{1}{5}$.

3. Reduce $\frac{3}{4}$ of a lb. troy to its proper quantity.
Ans. 7 oz. 4 dwt.

4. Reduce $\frac{4}{5}$ of a mile to its proper quantity.
Ans. 6 fur. 16 poles.

X. *To reduce any given quantity to the fraction of a greater denomination of the same kind.*

RULE. Reduce the given quantity to the lowest denomination mentioned for a new numerator, under which set the integral part (reduced to the same name) for a denominator, and it will express the fraction required.

EXAMPLES.

1. Reduce 16*s.* 8*d.* to the fraction of a pound.

16 8
12

200 5
——=—— the answer.
240 6

2. Reduce 2 quarters $3\frac{1}{2}$ nails to the fraction of an ell English. Ans. $\frac{5}{8}$.

3. Reduce 4*s.* $6\frac{1}{2}$*d.* to the fraction of a pound.

ADDITION OF VULGAR FRACTIONS.

I. *To add fractions that have a common denominator.*

RULE. Add their numerators together, and place the sum over one of the given denominators.

EXAMPLES.

1. Add $\frac{1}{9}$, $\frac{2}{9}$, $\frac{4}{9}$, $\frac{5}{9}$, and $\frac{7}{9}$ together.

$$\begin{array}{r} 1 \\ 2 \\ 4 \\ 5 \\ 7 \\ \hline 19 \end{array}$$

$\frac{19}{9} = 2\frac{1}{9}$ the answer.

2. Add $\frac{7}{24}$, $\frac{11}{24}$, and $\frac{13}{24}$ together. Ans. $1\frac{7}{24}$.
3. Add $\frac{13}{20}$, $\frac{17}{20}$, and $\frac{9}{20}$ together. Ans. $1\frac{19}{20}$.
4. Add $\frac{7}{16}$, $\frac{13}{16}$, and $\frac{15}{16}$ together. Ans. $2\frac{3}{16}$.

II. *To add mixed numbers whose fractions have a common denominator.*

RULE. Add the fractions by the last case, and the integers as in whole numbers.

EXAMPLES.

1. Add $2\frac{1}{11}$, $3\frac{2}{11}$, $4\frac{4}{11}$, and $7\frac{9}{11}$ together.

$$\begin{array}{r} 2\frac{1}{11} \\ 3\frac{2}{11} \\ 4\frac{4}{11} \\ 7\frac{9}{11} \\ \hline 17\frac{5}{11} \end{array}$$

answer.

2. Add $13\frac{1}{15}$, $9\frac{4}{15}$, and $3\frac{7}{15}$ together. Ans. $25\frac{4}{5}$.
3. Add $1\frac{1}{12}$, $2\frac{5}{12}$, $3\frac{7}{12}$, and $4\frac{1}{12}$ together. Ans. 12.
4. Add $9\frac{13}{14}$, $7\frac{9}{14}$, $5\frac{5}{14}$, and $8\frac{11}{14}$ together. Ans. $31\frac{5}{7}$.

III. *To add fractions, having different denominators.*

RULE. Find the least common denominator by Case III. *in Reduction*, in which divide each denominator, and multip-

the numerator by its numerator; the sum of the products is the new numerator to the common denominator, and the ratio required.

Examples.

1. Add $\frac{1}{2}$, $\frac{1}{3}$, $\frac{5}{6}$, $\frac{7}{8}$, and $1\frac{1}{12}$ together.

24 com. denom.

3	$8\times2=16$
4	$6\times3=18$
6	$4\times5=20$
8	$3\times7=21$
12	$2\times11=22$

$\frac{97}{24}=4\frac{1}{24}$, the answer.

2. Add $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{1}{4}$, and $\frac{1}{8}$ together. Ans. $1\frac{17}{24}$.

3. Add $\frac{1}{2}$, $\frac{2}{3}$, $\frac{1}{4}$, $\frac{5}{8}$, and $\frac{5}{16}$ together. Ans. $3\frac{5}{16}$.

IV. *To add mixt numbers whose fractions have different denominators.*

Rule. Add the fractions as in the last case, and the integers as in whole numbers.

Examples.

1. Add $5\frac{1}{2}$, $6\frac{2}{3}$, and $4\frac{1}{4}$ together.

24 com. denom.

$5\frac{1}{2}$	16
$6\frac{2}{3}$	21
$4\frac{1}{4}$	12
	—
Ans. $15\frac{49}{24}$,	$\frac{49}{24}=2\frac{1}{24}$.

2. Add $10\frac{1}{2}$, $\frac{2}{3}$, and $0\frac{5}{8}$ together. Ans. $11\frac{5}{24}$.

3. Add $15\frac{5}{6}$, $\frac{3}{4}$, and $\frac{7}{8}$ together. Ans. $16\frac{19}{24}$.

V. *When the fractions are of several denominations.*

Reduce them to their proper quantities by Case IX. Numeration, and add as before.

Examples.

1. Add $\frac{1}{9}$ of a £. to $\frac{3}{10}$ of a shilling.

15 common measure.

	s.	d.	
$\frac{1}{9}$ of a £. =	15	$6\frac{2}{3}$	10
$\frac{3}{10}$ of a S. =	0	$3\frac{1}{5}$	9
Ans.	15	$10\frac{4}{15}$	$\frac{13}{15} = 1\frac{4}{15}$

2. Add $\frac{2}{3}$ of a yard, $\frac{3}{4}$ of a foot, and $\frac{1}{8}$ of a mile together.
Ans. 1540 yds. 2 ft. 9 inches.

3. Add $\frac{1}{3}$ of a week, $\frac{1}{4}$ of a day, and $\frac{1}{2}$ of an hour together.
Ans. 2 d. $14\frac{1}{2}$ h.

SUBTRACTION OF VULGAR FRACTIONS.

I. *To find the difference between simple fractions that have a common denominator.*

Rule. Subtract the less numerator from the greater, and under the remainder put the denominator.

Examples.

From	$\frac{5}{7}$	$\frac{11}{12}$	$\frac{15}{16}$	$\frac{17}{35}$	$\frac{105}{209}$
Take	$\frac{2}{7}$	$\frac{5}{12}$	$\frac{3}{16}$	$\frac{13}{35}$	$\frac{99}{209}$
Rem.	$\frac{3}{7}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{4}{35}$	$\frac{6}{209}$

II. *To subtract a fraction or mixt number from a whole number.*

Rule. Subtract the numerator from the denominator, and under the remainder put the denominator, and carry one to be deducted from the integer.

Examples.

From	3	6	10	9	100
Take	$0\frac{3}{16}$	$0\frac{7}{8}$	$0\frac{1}{10}$	$5\frac{1}{2}$	$99\frac{99}{100}$
Rem.	$2\frac{13}{16}$	$5\frac{1}{8}$	$9\frac{9}{10}$	$3\frac{1}{2}$	$0\frac{1}{100}$

III. *To subtract simple fractions that have no common denominator.*

RULE. By Case IV. in Reduction, find a common denominator, as usual, under each denominator, and multiply the quotient by its numerator; the difference between the products is the numerator to the common denominator, and the answer required.

EXAMPLES.

From $\frac{17}{21}$ take $\frac{9}{14}$.

42 com. denom.

21 $2 \times 17 = 34$
14 $3 \times 9 = 27$

Rem. $\frac{7}{42} = \frac{1}{6}$, the answer.

From	$\frac{9}{10}$	$\frac{11}{12}$	$\frac{4}{5}$	$\frac{5}{13}$	$\frac{209}{210}$
Take	$\frac{2}{5}$	$\frac{5}{6}$	$\frac{2}{3}$	$\frac{2}{13}$	$\frac{1}{105}$
Rem.	$\frac{1}{2}$	$\frac{1}{12}$	$\frac{1}{15}$	$\frac{1}{13}$	$\frac{208}{210}$

In order to distinguish the greater of two fractions, let them be reduced to a common denominator, as in case V. in Reduction, and that fraction, whose numerator is greater, is the greater fraction; the difference between the new numerators, being set over the common denominator, will shew the excess or inequality.

EXAMPLE.

Which of the two is the greater fraction, $\frac{11}{12}$ or $\frac{15}{16}$?

48 com. denom.

12 $4 \times 11 = 44$
16 $3 \times 15 = 45$

Ans. $\frac{15}{16}$ is greater by $\frac{1}{48}$.

IV. *To subtract a fraction or mixt number from a mixt number, when the fractional part to be subtracted is greater than that from which it is to be subtracted.*

RULE. Find a common denominator and a new numerator, as in the last case, and then subtract the numerator of the *greater fraction* from the common denominator, and to the re-

mainder add the less numerator, and set the sum of both for a new numerator over the common denominator, and carry one to the integral part, and proceed as in whole numbers.

EXAMPLES.

		27 common denominator.
From	$13\frac{1}{3}$	$3 \times 1 = 3$
Take	$8\frac{14}{27}$	$1 \times 14 = 14$
	$4\frac{16}{27}$	$\frac{16}{27}$

From $6\frac{5}{7}$	$10\frac{3}{10}$	$12\frac{5}{12}$	$19\frac{5}{14}$
Take $0\frac{2}{7}$	$1\frac{7}{12}$	$6\frac{1}{2}$	$0\frac{7}{15}$
Rem. $5\frac{5}{7}$	$8\frac{23}{60}$	$5\frac{11}{12}$	$18\frac{103}{105}$

V. *When the fractions are of different denominations.*

RULE. Reduce them to their proper quantities, and subtract as before.

EXAMPLES.

1. From $\frac{7}{9}$ of a £. take $\frac{3}{10}$ of a shilling.

	s.	d.	15 common denominator.
$\frac{7}{9}$ of a £. =	15	$6\frac{2}{3}$	10
$\frac{3}{10}$ of a S. =	0	$3\frac{3}{5}$	9
Rem.	15	$3\frac{1}{15}$	

2. From $\frac{3}{4}$ of a £. take $\frac{3}{4}$ of a shilling. Ans. 14*s*. 3*d*.

3. From $\frac{3}{4}$ of a lb. troy take $\frac{1}{6}$ of an ounce.
Ans. 8 oz. 16 dwt. 16 grs.

4. From 7 weeks take $9\frac{7}{10}$ days. Ans. 5w. 4d. 7h. 12m.

5. From $\frac{1}{6}$ of a yard take $\frac{2}{3}$ of an inch. Ans. 5 inch. 1 bc.

MULTIPLICATION OF VULGAR FRACTIONS.

RULE. Reduce compound fractions to simple ones, and mixt numbers to improper fractions; then multiply the numerators together for a new numerator, and the denominators for a new denominator.

EXAMPLES.

[illegible]

[illegible] the answer.

[illegible] Ans. [illegible]

[illegible] Ans. [illegible]

[illegible] Ans. [illegible]

[illegible] Ans. [illegible]

[illegible] Ans. [illegible]

DIVISION OF VULGAR FRACTIONS.

[illegible]

EXAMPLES.

1. Divide [illegible]

[illegible] the answer.

2. Divide [illegible]

[illegible] Then [illegible] the answer.

3. Divide [illegible] Ans.

4. Divide [illegible] Ans.

5. Divide [illegible] Ans.

6. Divide [illegible] Ans.

MISCELLANEOUS QUESTIONS

IN THE PRECEDING RULES.

1. What part is [illegible] of [illegible]? Ans

2. What will remain if 13¾s. and 7⅝d. be taken from [illegible]

Ans. 5s. [illegible]

3. Which is the greater fraction $\frac{3}{11}$ or $\frac{5}{16}$?
Ans. $\frac{5}{16}$ is greater by $\frac{1}{176}$.

4. Of what number is 176 the $\frac{11}{12}$ part? Ans. 308.

5. By how much must you multiply $13\frac{1}{2}$ that the product may be $40\frac{1}{2}$? Ans. 3.

6. Find two numbers so that $\frac{11}{12}$ of the one will be as much as $\frac{7}{8}$ of the other. Ans. 126 and 208. or 63 and 104. &c.

7. Which is greater, $\frac{3}{4}$ of 6s. or 5s. $1\frac{1}{2}d.$?
Ans. 5s. $1\frac{1}{2}d.$ is greater by $\frac{1}{2}d.$

8. A has $\frac{3}{4}$ of $\frac{4}{5}$ of a ship, and B $\frac{4}{5}$ of $\frac{5}{6}$, which is the greater share, and by how much? Ans. A's share is greater by $\frac{1}{30}$.

9. A farmer being asked, how many sheep he had, answered, that he had them in 5 fields; in the first he had $\frac{1}{4}$ of his flock, in the second $\frac{1}{5}$, in the third $\frac{1}{6}$, in the fourth $\frac{1}{7}$, and in the fifth 450; how many had he? Ans. 1200.

RULE OF THREE DIRECT IN VULGAR FRACTIONS.

RULE. Having stated the question, make the necessary preparations, as in Reduction of Fractions, and invert the first term; then proceed as in multiplication of fractions.

EXAMPLES.

1. If $\frac{1}{4}$ of a yard of cloth cost $\frac{2}{3}$ of a shilling, what will $\frac{7}{8}$ of a yard come to?

$$\text{If } \overset{yd.}{\tfrac{1}{4}} : \overset{s.}{\tfrac{2}{3}} :: \overset{yd.}{\tfrac{7}{8}}$$

inverted

$$\frac{4\times 2\times 7}{1\times 3\times 8} \quad s. = \frac{56}{24} = 2s.\ 4d. \text{ the answer.}$$

2. If $\frac{3}{16}$ of a ship cost £.273 2s. 6d. what are $\frac{5}{8}$ of her worth? Ans. £.227 12s. 1d.

3. If $\frac{1}{4}$ of a yard cost $\frac{2}{3}$ of a pound, what will $\frac{3}{8}$ of an ell English come to, at the same rate? Ans. £.2.

4. A person, having $\frac{3}{5}$ of a coal mine, sells $\frac{2}{3}$ of his share for £.171: what is the whole mine valued at? Ans. £.380.

[illegible]

[illegible] miles.

[illegible] Ans. [illegible]

[illegible] Ans. [illegible]

[illegible] Ans. [illegible]

[illegible] Ans. [illegible]

.....

PRACTICE

[illegible] the Rule of Three direct, when the first [illegible] happens to be an unit, or one, and has its name from its frequent use in business.

THE TABLE.

Parts of a £.			Parts of a Ton.			Parts of ½ Cwt.		
s.	*d.*		*Cwt. Qr.*			*lb.*		
10	is	½	10	is	½	28	is	½
6	.....	⅓	5	....	¼	14	.....	¼
5	.....	¼	4	....	⅕	8	.....	⅛
4	.....	⅕	2	2	⅛	7	.....	⅛
3	4	⅙	1	....	⅒	4	.....	⅛
2	6	⅒				3½	.....	⅛
2	.....	⅒				2	.....	⅛
1	8	⅓						
1	.....	⅒						
Parts of a shilling.			Parts of a Cwt.			Parts of ¼ Cwt.		
d			*Qrs. lb.*			*lb.*		
6	is	½	2	is	½	14	is	½
4	.....	⅓	1	....	¼	7	.....	¼
3	.....	¼	16	....	¼	4	.....	⅛
2	.....	⅙	14	....	⅛	3½	.....	⅛
1½	.....	⅛	8	....	⅛	2	.....	⅛
1	.....	⅛	7	....	⅛	1	.....	⅛
			4	....	⅛			
			2	....	⅛			

Case I.

When the price is an aliquot, or even part of a shilling.

Rule. Divide the given number by the part, and the quotient is the answer in shillings; what remains is to be reduced as in Compound Division.

Examples.

1. What will 4596 yards cost at 6*d.* per yard?

6*d.*	$\frac{1}{2}$	4596
2/0		229/8
		114 18

Ans. £.114 18*s.*

	Yards.	*d.*		£.	*s.*	*d.*
2.	3746	at 4	per yard	Ans. 62	8	8
3.	1095	3		13	13	9
4.	7596	2		63	6	0
5.	3747	1		15	12	3
6.	3203	$1\frac{1}{2}$		20	0	$4\frac{1}{2}$

Case II.

When the price is pence, or pence and farthings, and no even part of a shilling.

Rule. Find the even parts for the price, and proceed as in Case I. and the sum of the quotients is the answer.

Examples.

1. What will 4937 yards come to, at 9*d.* per yard?

6	$\frac{1}{2}$	4937
3	$\frac{1}{2}$	2468 6
		1234 3
2/0		370/2 9

Ans. £.185 2 9

	Yards.		d.			£.	s.	d.
2.	2765	at	8	per yard	Ans.	92	3	4
3.	3784	.....	7	.....		109	14	6
4.	3108	.....	7½	.....		98	14	4½
5.	1408	.....	11	.....		68	11	4
6.	1887	.....	10½	.....		82	18	1½
7.	3016½	.....	5	.....		97	13	11½
8.	3784	.....	8½	.....		126	16	2½
9.	1824	.....	2½	.....		19	9	9½
10.	8014	.....	8½	.....		306	8	4½
11.	2184	.....	9½	.....		101	9	5½
12.	912	.....	10½	.....		4	3	9½
13.	8014	.....	9	.....		7	10	11½

Case III.

When the price is shillings, or shillings and pence, and an even part of a pound.

Rule. Divide the given quantity by the even part, and the quotient is the answer in pounds. If there be a remainder, reduce it as in Compound Division.

Examples.

1. At 6s. 8d. per yard, what will 473 yards come to?

6s. 8d. | ⅓ | 473

Ans. £157 13s. 4d.

	yards		s.	d.		£.	s.	d.
2.	3867	at	10		Ans.	193	10	0
3.	4758	.....	5		.....	119	10	0
4.	3967	.....	3	4	.....	66	3	4
5.	7917	.....	2	6	.....	99	13	9
6.	1597	.....	1	8	.....	13	5	5

Case IV.

When the price is shillings or shillings and pence, which makes no even part of a pound.

Rule. Find the even parts for the price, and divide as in Case III. or multiply the given quantity by the shillings, and take the even parts of shillings for the pence, as in Case II.

Examples.

1. *What cost* 287 yards at 17*s.* 6*d.* per yard?

First method.

s.	d.		287
10		½	143 10
5		¼	71 15
2	6	⅛	35 17 6
			Ans. £.251 2 6

Second method.

287
17 6

2009
287

6 | ½ | 143 6

2|0)502|2 6

Ans. £.251 2 6

	yards.		s.	d.	£.	s.	d.
2.	8172	at	15		Ans. 6129		
3.	3691		19		3506	9	
4.	4765		11	8	2779	11	8
5.	3718		18	4	3408	3	4
6.	709½		12	6	443	5	7½
7.	213		14	10	157	19	6
8.	96½		2	9½	13	9	4½
9.	158		5	8¼	45	5	2¼
10.	4705¼		3	9	882	6	6¾
11.	127		7	5¼	47	9	10¼

Case V.

When the price is an even number of shillings.

Rule. Multiply the quantity by half the shillings, doubling the first (or right hand) figure of the product for shillings, the rest are pounds.

Examples.

1. What will 788 yards come to, at 2 shillings per yard?

788
1=half the shillings.

Ans. £.78 16

	yards.		s.	£.	s.
2.	347	at	4	Ans. 69	8
3.	638		6	191	8
4.	589¼		8	235	14
5.	246		10	123	0
6.	324¾		12	194	17
7.	523		14	366	2
8.	745		16	596	0
9.	373½		18	336	3
10.	270		20	270	0
11.	172½		22	189	15
12.	89¼		24	107	2

	Tons.	cwt.	qrs.	lb.		£.	s.	d.		£.	s.	d.
2.		57	2	8	at	3	17	9	Ans.	223	16	8
3.		19	3	13	.....	2	5	10	.....	45	10	6
4.		75	3	25	.....		48	5	.....	183	18	4¼
5.		2	1	18	.....		59	8	.....	7	3	10
6.		1	1	11	.....		63	9	.....	4	5	11¼
7.		0	3	19	.....		54	0	.....	2	9	7½
8.	37	14	2	14	hemp	89	6	8	per ton	3370	13	2
9.	27	16	3	18	.....	90	10		.....	2520	0	5
10.		15	2		.....	92	5		.....	71	9	10½
11.	17	10	2		.....	91	10		.....	1603	10	9

.....

1. What will 37 cwt. 3 qrs. 7 lb. of sugar come to, at 14 dols. 40 cts. per cwt. ?

14,40
37

10080
4320
2 qr. ¼ 720
1 qr. ½ 360
7 lb. ¼ 90

544,50 Ans. 544 dols. 50 cts.

	Tons.	cwt.	qr.	lb.		dols.	cts.			dols.	cts.
2.	24	18	3	18	of hemp at	289	50	per ton	Ans.	7221	73
3.	31	16			.....	268	75	.....		8346	25
4.	19	14	2	12	iron	110		.....		2170	33 8
5.		17	3	24	cordage	14		per cwt.		251	50

	A.	R.	per.			dols.	cts.			dols.	cts.
6.	25	2	25	of land	at	29		per acre	Ans.	744	3
7.	87	1	37	.....		33		.....		2886	88
8.	229	3	18	.....		18	50	.....		4252	45½
9.		3	26	.....		25		.....		22	81

.....

1. How much will 49 M. 3 hund. 25 casts of staves come to, at 17 dols. per M.

49
17

343
49
2 hund. ¼ 3,4
1 ½ 1,7
20 casts ¼ ,85
5 ¼ ,212

839,162 Ans. 839 dols. 16 cts. 2 m

	M.					dols.		dols.	cts.
2.	19	4	10	W. O.	hhd. staves	31	per M. Ans.	614	96
3.	22	1	17	R. O.	do. do.	13		298	90
4.	34	1	3	W. O.	barrel do.	13		449	93
5.	4	2	11			15		63	41

.....

1. What will 8,757 feet of merchantable boards come to, at 38 s. 6 d. per M. ?

8,757
38 6

701 56
262 71
4,383

20 337 549 shillings.

Ans. £16 17 6

The fourth figure of the product of the remainder, multiplied by 12, is set down for pence.

			s.	£.		£.	s.	d.
2.	13,7[illegible]	feet merch. boards	52	8	per M. Ans.	36	8	8
3.	2,[illegible]	do. do.	37	4		5	5	2
4.	[illegible]	do. do.	41	0		0	13	5
5.	153	do. scrub	20	6		0	3	9

What is the amount of a seaman's wages from the 15th of November to the 31st of December following, being 8 months and 2[illegible] days, at 15 dollars per month ?

15
8

125 for 8 months.

15 days 8
½ 2,66⅔

138 66⅔ Ans. 138 dols. 66⅔ cts.

Note. In calculating the time of seaman's service, either of the days of shipping and being discharged is taken, but not both.

What is the amount of a seaman's wages from 15th of June to the 15th of May following, at 15 dols. per month ?

Ans. 171 dols.

At £.4 11 3 per cwt. what will 3 qrs. 25½ lb. come to?

		£.		
		4	11	3
2 qrs.	½	2	5	$7\frac{1}{2}$
1 qr.	½	1	2	$9\frac{3}{4}$
14 lb.	½	0	11	$4\frac{7}{8}$
7	½	0	5	$8\frac{7}{16}$
3½	½	0	2	$10\frac{7}{32}$
1	¼	0	0	$9\frac{87}{112}$
	Ans.	£.4	9	$2\frac{85}{224}$.

What will 19 tons, 19 cwt. 3 qrs. 27½ lb. come to at £.19 19*s.* 11¾*d.* per ton? Ans. £.399 19*s.* $5\frac{1}{4}\frac{66}{70}\frac{41}{20}$.

TARE AND TRET.

TARE and TRET are allowances made in selling goods by weight.

Tare is an allowance made to the buyer for the weight of the hogshead, barrel, or bag, containing the commodity.

Tret is an allowance for waste, dust, &c. generally at 4 lb. per 104 lb.

Cloff is an allowance for the turn of the scale, at 2 lb. per 3 cwt.

Gross weight is the whole weight of the goods, together with the hogshead, barrel, or bag, &c. that contains them.

Suttle is when part of the allowance is deducted from the gross.

Neat weight is what remains after all allowances are made.

COPPER AND

Ans. £27 13 9½

Ans. 292 dols. 50 cent

3. At 9 dols. 49 cts. per cwt. what will 3 hhds. of tobacco come to, weighing gross, viz.

	cwt.	qrs.	lb.	lb.
No. 1.	9	3	25	tare 149
2.	10	2	12	150
3.	11	1	25	158

Ans. 265 dols. 46¼ cents.

4. At 79*s.* 9*d.* per cwt. how much will 4 hhds. of madder come to, weighing gross, viz.

	cwt.	qrs.	lb.	
No. 1.	10	3	4	
2.	11	2	13	
3.	10	1	16	
4.	14	3	19	tare 14 lb. per cwt.
14 lb. ⅛	47	2	24	gross
	5	3	24	tare
	41	3	0	neat.

Ans. £.166 9 6¾.

5. At 62*s.* per cwt. what will a hhd. of sugar come to, weighing gross 7 cwt. 1 qr.; tare 12 lb. per cwt. ?

Ans. £.20 1 4.

6. At 21 cents per lb. what will 6 hhds. of coffee come to, weighing gross, viz.

	cwt.	qr.	lb.		lb.
No. 1.	7	1	14	tare	96
2.	8	2	21	.....	98
3.	7	1	21	.....	91
4.	6	3	25	.....	90
5.	7	0	23	.....	89
6.	8	1	12	.....	100

Ans. 964 dols. 32 cents.

7. What would the above coffee amount to, allowing 12 lb. per cwt. as tare on the gross weight ? Ans. 966 dols. 84 cts.

8. At 72*s.* 6*d.* per cwt. how much will 8 hhds. of sugar come to, weighing gross each 8 cwt. 3 qrs. 7 lb. ; tare 12 lb. per cwt. ? Ans. £.228 3 7¼

9. At 23 cents per lb. what will 4 bags of coffee come to, weighing gross 450 lb. ; tare 2 per cent. or 2 lb. per 100 lb. ?

Ans. 101 dols. 43 cents.

10. At 12 dols. 50 cents per cwt. what will 3 barrels of sugar come to, weighing gross, viz.

	cwt.	qrs.	lb.	
No. 1.	2	2	10	
2.	2	1	21	
3.	2	0	15	Tare 21 lb. per barrel.

Ans. 82 dols. 47 cts. 7 m

11. At 15 dols. 40 cts. per cwt. what will 4 hhds. of sugar come to, weighing gross, viz.

	cwt.	*qrs.*	*lb.*	
No. 1.	7	3	13	
2.	8	1	10	
3.	7	2	12	
4.	8	1	21	Tare 12 lb. per cwt.

Ans. 443 dols. 43 cts. 7 ms.

12. A has in his possession a hhd. of sugar, weighing gross 9 cwt. 3 qrs. owned equally between him and B. It is required to know how much sugar he should weigh out to B, allowing tare 12 lb. per cwt.? Ans. 4 cwt. 1 qr. 11½ lb.

13. At 19½ cents per lb. what will 2 hhds. of coffee come to, weighing gross 15 cwt. 3 qrs. 11 lb. allowing custom-house tare or 12 lb. per 100?

15 3 11

1500 = fifteen hundred.
180 = 15 × 12 for excess in each cwt.
84 = three quarters.
11

Gross	1775		1775
Tare	213	Tare	12 per 100.
Neat	1562		213,00

19½

14058
1562
781

30459 cts. Ans. 304 dols. 59 cts.

14. B buys of C a hogshead of coffee, weighing gross 9 cwt. 2 qrs. tare 12 lb. per cwt. what will it amount to at 23 cents per lb.? Ans. 218 dols. 50 cents.

15. If custom-house tare, or 12 lb. per 100, were allowed on the above coffee, what would it amount to, and what difference would it make to the buyer?

Ans. It amounts to 215 dols. 51 cts. being 2 dols. 99 cts. in his favour.

16. What is the gross weight of a hogshead of tobacco, weighing neat 11 cwt. 1 qr. tare 14 lb. per cwt.?

Ans. 12 cwt. 3 qrs. 12 lb.

FELLOWSHIP

Is when two or more join their stocks and trade together, dividing their gain or loss, in proportion to each person's share in the joint stock.

SINGLE FELLOWSHIP.

Single Fellowship is when different stocks are employed for a certain equal time.

RULE. As the whole stock is to the whole gain or loss, so is each man's particular stock to his particular share of the gain or loss.

EXAMPLES.

1. A and B buy certain merchandizes, amounting to £.120, of which A pays £.80 and B £.40, and they gain by them £.32—what part of it belongs to each ?

A £.80
B 40

As 120 : 32 : : $\begin{cases} 80 \\ 40 \end{cases}$ Ans. £.21 6 8 A.
10 13 4 B.

2. A ship worth 8400 dollars being lost at sea, of which $\frac{1}{7}$ belonged to A, $\frac{1}{3}$ to B, and the remainder to C, what loss will each sustain, supposing they have 6000 dollars insured ?

Ans. A's loss 600, B's 800 and C's 1000 dols.

3. A and B have gained 1260 dollars, whereof A is to have 10 per cent. more than B, what is the share of each ?

Ans. A's 660, B's 600 dols.

4. A bankrupt is indebted to A 500 dols. 37 cts. to B 228 dols. to C 1291 dols. 23 cts. to D 709 dols. 40 cts. and his estate is worth but 2046 dols. 75 cts. how much does he pay per cent. and what is each creditor to receive ?

Ans. He pays 75 per cent. and A's part is 375 dols. 27$\frac{3}{4}$ cts. B's 171 dols. C's 968 dols. 42$\frac{1}{4}$ cts. and D's 532 dols. 5 cts.

5. Three boys, John, James and William, buy a lottery ticket for 3 dols. of which John pays 90 cts. James 1 dol. and William the remainder. This ticket is entitled to a prize of 2000 dollars, subject to a deduction of 12$\frac{1}{2}$ per cent. how much is each to receive ?

Ans. John 525 dols. James 583 dols. 33$\frac{1}{3}$ cts. William 641 dols. 66$\frac{2}{3}$ cts.

525638

6. Three merchants made a joint stock—A put in £.5 6 8, B £.478 5 4 and C a certain sum, and they gain £.373 9 11, of which C took for his part £.112 11 11—quired A and B's part of the gain, and how much C put in?

Ans. A's gain £.141 6 8, B's £.119 11 4, and C put £.450 7 8.

7. Three men have to share a legacy of 1500 dols. of whi B is to have ½, C ¼ and D the remainder, but C relinquishes part to B and D, leaving it to be divided between them, a cording to their shares in the whole. It is required to kn how much of the legacy B and D receive respectively?

Ans. B's part is 1000, D's 500 dols.

.....

DOUBLE FELLOWSHIP.

Double Fellowship is when the stocks are employed for d ferent times.

RULE. Multiply each man's stock by its time, and add th together, then say, As the sum of the products is to the wh gain or loss, so is the product of each man's stock and time his share of the gain or loss.

1. B and C trade in company, B put in £.950 for 5 mont and C £.785 for 6 months, and by trading they gain £.2 18 4; what is each man's part of the profit?

B's stock $950 \times 5 = 4750$

C's $785 \times 6 = 4710$

As $9460 : 275\ 18\ 4 :: \begin{cases} 4750 : £.138\ 10\ 10 \\ 4710 : \quad 137\ 7\ 6 \end{cases}$

2. Two merchants enter into partnership for 16 months. put into stock at first 1200 dols. and at the end of 9 mon 200 dols. more, B put in at first 1500 dols. and at the expi tion of 6 months took out 500 dols.—with this stock they ga ed 772 dols. 20 cts. what is each man's part of it?

Ans. A's 401 dols. 70 cts.—B's 370 dols. 50 cts.

3. Two persons hired a coach in Boston, to go 40 mil for 20 dols. with liberty to take in 2 more when they plea Now when they had gone 15 miles, they admit C, who wish to go the same route, and on their return, within 25 miles Boston, they admit D for the remainder of the journey. N *as each person* is to pay in proportion to the distance he ro *it is required* to settle the coach-hire between them.

Ans. A and B 6 dols. 40 cts. each, C 5 dols. 20 cts. and D 2 ?

SIMPLE INTEREST

Is a compensation made by the borrower of any sum of money to the lender, according to a certain rate per cent. agreed on for the principal only.

The legal rate of interest in Massachusetts is 6 per cent.

Principal, is the money lent.

Rate, is the sum per cent. agreed on.

Amount, is the principal and interest added together.

GENERAL RULE. Multiply the principal by the rate per cent. and divide the product by 100, and the quotient is the answer for one year.

EXAMPLES.

1. What is the interest of £.496 for one year at 6 per cent.?

496
6
29|76
20
15|20
12
2|40
4
1|60 Ans. £.29 15 2¼.

2. What is the interest of £.383 15 9 for 2 years, at 8½ per cent.?

383 15 9
8½
3070 6 0
191 17 10½
32|62 3 10½
20
12|43
12
5|26
4
1|06 £.32 12 5¼ for one year.
2
Ans. £.65 4 10½ for 2 years.

3. What will £.826 13 9 amount to in 1 year, at 5 per cent.?

$5 = \frac{1}{20}$)826 13 9 principal.
41 6 8¼ interest.

Ans. £.868 0 5¼ amount.

4. What is the interest of £.103 11 4, for 4 years, at 7½ per cent. per annum? Ans. £.31 1 4½.

5. What will £.36 14 9 amount to, in 3 years, at 5 per cent. per annum? Ans. £.42 4 11¼.

6. What is the amount of £.19 15 8, for 5 years, at 6¾ per cent. per annum? Ans. £.26 9 1¼.

7. How much is the interest of £.72 12 6, for 6 months, at 6 per cent. per annum?

72 12 6
6

4)435 15 0
20

7)15
12

1 80
4

3)20

6 m. $\frac{1}{2}$)4 7 1¾ for 1 year.

Ans. £.2 3 6¾ for 6 months.

Note. When the time is months, multiplying by the rate for the time gives the answer. This rate is found by multiplying the time by the given rate per cent. for a year, and dividing the product by 12. The quotient is the rate required, and is always equal to half the months when the yearly rate is 6 per cent.

8. What is the interest of £.25 19 3 for 8 months, at 6 per cent. per annum?

8 months
6

12)48

4 rate = half the months.

£.25 19 3
4

1,03 17 0
20

0,77
12

9,24 Ans. £.1 0 9

9. How much will £.53 9 4 amount to, in 20 months, at 6 per cent. per annum? Ans. £.58 16 3.

10. How much is the interest on a bond of £.295 17 10 for 18 months, at 8 per cent. per annum?

18 / 8 / 12)144 / 12

295 17 10 / 12 the rate for the time.

35,50 14 0 / 20 / 10,14 / 12 / 1,68 / 4 / 2,72 Ans. £.35 10 1½.

11. How much is the interest of £.80 12 9, for 23 months, at 6 per cent. per annum? Ans. £9 5 5¼.

12. How much is the interest of £.36 14 9 from 19th May to 25th October, at 6 per cent?

36 14 9 / 6 / 2,20 8 6 / 20 / 4,08 / 12 / 1,02

4 m. = ⅓)2 4 1 for 1 year.

0 14 8½

1 m. = ⅓ 0 3 8

6 d. = ½ 0 0 8¾

Ans. £.0 19 1

13. What will £.187 14 9 amount to, from 11th June, 1797, to 26th October, 1798, at 6 per cent. per annum? Ans. £.203 4 5¾.

14. How much is the interest of £.19 13 7 from 3d. January, 1797, to 18th May, 1798, at 6 per cent. per annum? Ans. £.1 12 5¼.

To find the interest of any sum for months, at 6 per cent. per annum, by contraction.

RULE. Multiply the pounds by the number of months; the first or units figure of the product is pence, and the rest are shillings, observing to increase the pence in the product by 1 when they exceed 4.

Examples.

15. What is the interest of £.56 for 1, 5, 7, and 12 months?

	56	56	56	56
mo.	1	5	7	12
Ans.	5s. 7d.	28s. 0d.	39s. 2d.	67s. 2d.

16.	£.45	for	6	Months.	Ans. £.1 7 0
17.	324		5		8 2 0
18.	19		7		0 13 3
19.	11		1		0 1 1

If there are Shillings, &c.

To the pounds add the decimal of the nearest even number of shillings (this will be sufficiently exact for business), and multiply by the months as before, separate two figures of the product to the right, and the left hand figures are the shillings, then multiply the figures pointed off, by 12, and the product, rejecting two figures to the right, is the pence of the answer.

2	4	6	8	12	14	16	18 shillings.
,1	,2	,3	,4	,6	,7	,8	,9 decimals.

20. How much is the interest of £.347 5 9 for 3 months?

347,3
3

shillings 104,19

Ans. £.5 4 2

21. How much is the interest of £.195 15 10½ for 10 months?

195,8
10

shillings, 195,80

Ans. £.9 15 9½

,80
12

9,60
4

2,40

The value of the remainder is thus shewn to be 9½*d*.

22. What is the interest of £590 19 9¾ for 3 years, 7 months and 19 days?

£.591 nearly.
43

1773
2364
15 days ½ 295
3 ⅕ 59
1 ⅓ 19

2578,6+1 because it exceeds 4—see the Rule.

£.128 18 7

23. How much is the interest of £.476 9 8 for 9 months and 13 days?

476,5
9

4288,5
10 days ⅓ 158,8
3 do. 1/10 47,6

449,49

Ans. £.22 9 5¾.

24. What is the interest of £.40, for 7 years 5 months and 26 days?

40
89 months

3560
15 days ½ 20
10 do. ⅓ 13
1 do. 1/10 1

359,4

Ans. £.17 19 5

25. What is the interest of £240, for 50 days, at 6 per cent.?

	Or by Compound Proportion.
240	240
6	50
14,40	6083)12000(1
20	6083
8,00	5917
	20
d. *d.*	
365 : 14*l.* 8 :: 50 : 1*l.* 19*s.* 5½*d.*	6083)118340(19
	6083
	57510
	54747
	2763
	12
	6083)33156(5
	30415
	2741
	4
	6083)10964(¼
	6083
Ans. £.1 19 5¼	4881

SIMPLE INTEREST IN FEDERAL MONEY.

The principal given in English money, and the interest required in federal.

RULE. Reduce the given sum to shillings, the product gives the answer in cents, and the pence are mills nearly; the reason is, that at 6 per cent. per annum, one fifth of a dollar is the annual interest of a pound; that is, 20 cents for 20 shillings, or 1 cent for every shilling in any given sum.

EXAMPLES.

1. Required the interest of £.194 15 3 for 1 year in federal money.

194 15 3
20

3895 cents. Ans. 38 dols. 95 cts. 3 mills.

2. What is the interest of £.129 13 2 for 2 years in federal money?

129 13 2
20

2593,2 for one year.
2

5186,4 Ans. 51 dols. 86 cts. 4 ms.

3. What is the interest of £.91 12 1 for 5 years, in federal money?

91 12 1
20

1832,1 for 1 year.
5

91,605 for 5 years. Ans. 91 dols. 60½ cts.

4. What is the interest of £.139 17 2 for 4 months?

139 17 2
20

4 m. ⅓ 2797,2

9,32,4 Ans. 9 dols. 32 cts. 4 ms.

.....

Principal in federal money, and Interest required in the same.

RULE. Multiply the principal by the rate per cent. and as ou suppose 100 for a divisor, point off the quotient as in di- ision of decimals.

The following rule answers the same purpose.

When the principal is dollars only, multiply by the rate, and rom the product point off two figures to the right, the figures o the left hand of the point give the answer in dollars, and the est are decimal parts or cents.

If there are cents, &c. in the principal, multiply by the rate nd point off as above. The figures to the left of the point give ie answer in the same name with the lowest denomination in ie *principal*.

10. How much is the interest of 187 dols. 25 cts. for 16 months, at 6 per cent. per annum?

187,25
8

Cents 1498,00 Ans. 14 dols. 98 cts.

11. What is the interest of 95 dollars, for 2 months, at 6 per cent. per annum?

95
1

,95 Ans. 95 cents.

12. How much is the interest of 126 dols. 46 cts. for 9 months, at 6 per cent?

126,46
4½

505 84
63 23

Cents 569,07 Ans. 5 dols. 69 cts.

13. How much is the interest of 124 dols. for one month, at 6 per cent.?

½)124
,62

Or 124
,5
,62,0 Ans. 62 cts.

14. What is the interest of 694 dols. 84 cts. for nine months, at 10 per cent. per annum?

694,84
10

Cents 6948,40 for a year.

6 ½ 3474,2
3 ½ 1737,1

52,11,3

Or 694,84
7½ = rate for the time.

4863,88
347,42

Cents 52,11,30

Ans. 52 dols. 11 cts. 3 m.

15. How much is the amount of 985 dollars, for 5 years and 8 months, at 6 per cent. per annum?

dols.	
985	
3½	half the months.
3940	
2955	
334,90	interest.
985,	principal.
1319,90	amount.

Ans. 1319 dols. 90 cts.

.....

When the time is months and days, and the annual rate 6 per cent. Multiply by half the months and one sixth of the days, which is equal to the rate, for the given time, and separate one figure to the right for the decimal in the rate, and proceed as usual. Should there be a remainder in taking a sixth of the days, reduce it to a vulgar fraction; this, and not the decimal, will *always* give the exact rate.

EXAMPLES.

16. What is the interest of 194 dols. for 4 months and 12 days, at 6 per cent.?

m.	*m.*	*dols.*	
		194	
12 : 6 : :	4,4	2,2	= to the rate, found by the rule,
	6		or the annexed calculation.
		388	
12)	26,4	388	
	2,2	4,26,8	

Ans. 4 dols. 26 cts. 8 ms.

17. How much is the interest of 263 dols. 48 cts. for 2 months and 21 days, at 6 per cent.?

dols. cts.	
263,48	
1,3½	
79044	
26348	
13174	
Cents 355,69,8	

Ans. 3 dols. 55 cts. 6 ms.

18. How much is the interest of 318 dols. for 10 months and 16 days, at 6 per cent.?

318
5,2⅔

636
1590
⅔ 106
⅓ 106

dols. 16,74,8 Ans. 16 dols. 74 cts. 8 m.

19. What is the interest of 418 dols. for 1 year 7 months and 17 days, at 6 per cent.?

418
9,7½

2926
3762
⅔ or ½ . 209 } =348⅓
⅔ or ⅓ . 139 }

dols. 40,89,4 Ans. 40 dols. 89 cts. 4 m.

418
5

6)2090

348⅓

20. How much is the interest of 268 dols. 44 cts. for 3 years 5 months and 26 days, at 6 per cent.?

268,44
20,9⅓

241596
536880
⅓ 89488

Cts. 5619,34,4 Ans. 56 dols. 19 cts. 3 m.

21. What is the interest of 1 dollar, for 18 days, at 6 per cent.?

1
,3

,00,3 mills. Ans. 3 mills.

One figure is separated for the decimal in the multiplier, and two cyphers are supplied and pointed, according to the general rule.

22. What is the interest of 910 dols. 50 cts. for 3 years, 9 months, and 26 days, at 7 per cent. per annum ?

	910,50	Or thus,	910,50
	7		22,9⅓
	63,73,50		819450
	3		182100
			182100
	191,20,5	for 3 years.	30350
6 mo.	½ 31,86,7		
3 mo.	¼ 15,93,3		⅓)208,80,80 0 at 6 per cent.
15 days	⅛ 2,65,5		34,80,1
10 days	⅓ 1,77,0		
1 day	1/10 ,17,7		dols. 243,60,9 at 7 per cent.
dols.	243,60,7		Ans. 243 dols. 60 cts. 8 mills.

23. How much will 185 dols. 26 cts. amount to, in 2 years 3 months and 11 days, at 7½ per cent. per annum ?
Ans. 216 dols. 94 cts. 4 mills.

24. What is the interest of 57 dols. 78 cts. for 1 year 4 months and 17 days, at 4 per cent. per annum ?
Ans. 3 dols. 19 cts.

25. How much is the amount of 298 dols. 59 cts. from 19th May, 1797 to the 11th of August, 1798, at 8 per cent. per annum ? Ans. 327 dols. 98 cts. 4 mills.

26. How much is the amount of 196 dollars, from June 14, 1798, to April 29, 1799, at 5¾ per cent. per annum ?
Ans. 205 dols. 86 cents.

27. What is the interest of 658 dols. from January 9 to October 9 following, at ½ per cent. per month ?
Ans. 29 dols. 61 cents.

In the calculation of interest in federal money, thus far, the year is supposed to be 12 months of 30 days each, making it only 360 days. Most persons use this method of computing the time, but as it is 5 days less in a *year than* the true number, some merchants calculate by days, without any *regard to months*, as being more accurate.

EXAMPLES.

28. What is the interest of 7086 dollars for 39 days, at 6 per cent. per annum?

By compound proportion.

7086
39
63774
21258
dols. cts.
6083)276354(45 43
24332
33034
30415
26190
24332
18580
18249
331 Ans. 45 dols. 43 cts.

29. What is the interest of 87 dols. 56 cts. for 72 days, at 6 per cent. per annum?

87,56
72
17512
61292
cts. m.
6083)6304,32(103 6
6083
22132
18249
38830
36498
2342 Ans. 1 doll. 3 cts. 6 m.

					dols.	cts.	m.
[illegible]	[illegible]	[illegible]	[illegible] at 6 per ct. per ann.	Ans.	123	68	8
[illegible]			[illegible]		1	47	2
[illegible]	[illegible]	[illegible]	10[illegible]		29	7	5
[illegible]			47		3	51	9
[illegible]			[illegible]		4	43	4
	[illegible]		[illegible]		7	15	1
			[illegible]		1	11	3

[illegible] method of calculating the interest upon accounts, when [illegible] partial payments [illegible] made.

	days.	dols.	Prod. princ. & time.
[illegible] at interest [illegible]	[illegible]	[illegible]	1300
		[illegible]	1050
		[illegible]	672
		[illegible]	1001
		[illegible]	318
		[illegible]	2390
		[illegible]	507
		[illegible]	898
		[illegible]	1490
		[illegible]	42
			[illegible]

[illegible] interest at 6 per cent.

[illegible] the principal [illegible]

[illegible] the amount due March [illegible].

By this method interest may be calculated on accounts, multiplying each sum by the days it is at interest, and taking the quotient of 36500, divided by the rate per cent. as a fixed divisor to the sum of the products. Thus, the rate in the last example being 6 per cent. the divisor is 6083; for 5 per cent. it would be 7300; for 7 per cent. 5214, &c.

If the time is *months*, multiply each sum by the months it is at interest, and take the quotient of 1200, divided by the rate as a divisor. Thus, for 6 per cent. the divisor is 200; for 5 per cent. 240; for 8 per cent. 150, &c.—(*See Compound Proportion.*)

.....

IN COMPUTING INTEREST ON NOTES, &c.

It has generally been the custom to find the amount of the principal from the time the interest commenced to the time of settlement, and likewise the amount of each payment, and then deduct the amount of the several payments from the amount of the principal.

EXAMPLE.

A, by his note dated April 25th, 1798, promises to pay to B 774 dols. 76 cts. on demand, with interest to commence 4 months after the date. On this note are the follow endorsements:

Received, *Oct.* 12th, 1798, 260 dols. 19 cts.—*Oct.* 13th, 1798, 60 dols.—*Nov.* 2, 1798, 200 dols. And the settlement is made *Dec.* 15th, 1798.

CALCULATION.

	dols. cts.	*dols. cts.*
The principal carrying interest from 25th Aug. 1798		774 76
Interest to Dec. 15th, 1798 ..... 3 m. 20 days		14 20
Amount of the principal		788 96
First payment, Oct. 12th, 1798	260 19	
Interest to Dec. 15th, 1798 .... 2 ms. 3 days	2 73	
Second payment, Oct. 13th, 1798	60 00	
Interest to Dec. 15th, 1798 .... 2 ms. 2 days	0 62	
Third payment, Nov. 2, 1798	200 00	
Interest to Dec. 15, 1798 ..... 1 m. 13 days	1 43	
Amount of the payments		524 97
Settlement is made for ..... Dollars—		263 99

[illegible] Massachusetts [illegible]

[illegible]

The following example will illustrate the rule [illegible] which the interest [illegible] at the rate of six per cent. [illegible] Massachusetts.

[illegible] note dated January 1, 1780, promises to pay B 1000 dols. [illegible] months from the date, with interest from the date.

On the note are the following endorsements.

[illegible] 1780, 24 dols.—*August* 1, 1780, 4 dols.—[illegible] 1781, [illegible] dols.—*July* 1, 1781, [illegible] dols.—*Sept.* 1, 1784, 12 dols.—[illegible] and *Oct.* 1, 1785, 50 dols.—and the [illegible] *Dec.* 1, 1790.

CALCULATION.

	dols. cts.
[illegible] from Jan. 1, 1780	1000 00
[illegible] months	15 00
Amount	1015 00
[illegible] for interest	24 00
[illegible]	991 00
[illegible] to Feb. 1, 1781, [illegible]	49 55
Amount	1040 55
[illegible] 4 00	
[illegible] 6 00	
[illegible] 1, 1781, [illegible] 60 00	
	70 00

	dols. cts.
Remainder for a new principal	970 55
Interest on 970 dols. 55 cts. from Feb. 1, 1781, to July 1, 1781, (5 months)	24 26
Amount	994 81
Paid July 1, 1781, a sum exceeding the interest	40 00
Remainder for a new principal	954 81
Interest on 954 dols. 81 cts. from July 1, 1781, to June 1, 1784, (2 years 11 months)	167 09
Amount	1121 90
Paid June 1, 1784, a sum exceeding the interest	300 00
Remainder for a new principal	821 90
Interest on 821 dols. 90 cts. from June 1, 1784, to Oct. 1, 1785, (1 year 4 months)	65 75
Amount	887 65
Paid Sept. 1, 1784, a sum less than the interest then due, *Dls.* 12 00	
Paid Jan. 1, 1785, do. do.	15 00
Paid Oct. 1, 1785, do. greater with two last payments than interest then due	50 00
	77 00
Remainder for a new principal	810 65
Interest on 810 dols. 65 cents, from Oct. 1, 1785, to Dec. 1, 1790, the time when judgment is to be entered (5 years 2 months)	251 30
Judgment rendered for the Amount	1061 95

* * * * * *

A TABLE,

Shewing the number of Days, from any Day in any Month, to the same Day in any other Month, through the Year.

From	Jan.	Feb.	Mar.	Ap.	May.	Jun.	July.	Aug.	Sep.	Oc.	Nov.	Dec.
To Jan.	365	334	306	275	245	214	184	153	122	92	61	31
Feb.	31	365	337	306	276	245	215	184	153	123	92	62
Mar.	59	28	365	334	304	273	243	212	181	151	120	90
April	90	59	31	365	335	304	274	243	212	182	151	121
May	120	89	61	30	365	335	304	273	242	212	181	151
June	151	120	92	61	31	365	335	304	273	243	212	182
July	181	150	122	91	61	30	365	334	303	273	242	212
Aug.	212	181	153	122	92	61	31	365	334	304	273	243
Sept.	243	212	184	153	123	92	62	31	365	335	304	274
Oct.	273	242	214	183	153	122	92	61	30	365	334	304
Nov.	304	273	245	214	184	153	123	92	61	31	365	335
Dec.	334	303	275	244	214	183	153	122	91	61	30	365

USE OF THE TABLE.

[illegible] between the 1st of May and the [illegible] the thirteen months between May [illegible] 154.

[illegible] is the number of months [illegible] from the former number. Thus [illegible] days, and from [illegible] days.

[illegible] thus [illegible] the 4th of Sept. 1791, is [illegible]

[illegible] a Bond [illegible] in the [illegible]

SIMPLE INTEREST

[illegible] and interest; [illegible] and not paid, [illegible] in this [illegible]

[illegible] of the year, and sum [illegible] and the [illegible] the amount of the last year [illegible] from the [illegible]

EXAMPLES.

[illegible] for 3 years, at [illegible]

[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		first year's interest.
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		amount of the first year.
[illegible]	[illegible]	[illegible]		second year's interest.
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		amount of the second year.
[illegible]	[illegible]	[illegible]		third year's interest.
[illegible]	[illegible]	[illegible]		
238	17	6		amount of the third year.
200	14	6		first principal.
47	2	6	compound in	three years.

2s. 6d.

2. What is the compound interest of £.760 10*s.* for 4 years, at 6 per cent. per annum? Ans. £.199 12*s.* 2*d.*

3. How much is the amount of £.128 17*s.* 6*d.* for six years, at 6 per cent. per annum, compound interest?

Ans. £.182 16 $2\frac{3}{4}$.

4. How much is the amount of 500 dollars, for three years, at 6 per cent. per annum, compound interest?

5	$\frac{1}{20}$	500,	
1	$\frac{1}{5}$	25,	first interest.
		5,	
5	$\frac{1}{20}$	530,	
1	$\frac{1}{5}$	26,50	second interest.
		5,30	
5	$\frac{1}{20}$	561,80	
1	$\frac{1}{5}$	28,09	third interest.
		$5,61\frac{3}{4}$	
		$595,50\frac{3}{4}$	the amount required.

Ans. 595 $50\frac{3}{4}$ cts.

5. What is the amount of 629 dollars, for 7 years, at 6 per cent. per annum, compound interest? Ans. 945 dols. 78 cts. 3 m.

6. How much is the compound interest of 1256 dollars, for 15 years, at 6 per cent. per annum? Ans. 1754 dols. 6 cts. 6 m.

A TABLE

Shewing the amount of one pound or one dollar for any number of years under 33, at the rates of 5 and 6 per cent. per annum, compound interest.

Years.	Rates. 5	6	Years.	Rates. 5	6
1	1,05000	1,06000	17	2,29201	2,69277
2	1,10250	1,12360	18	2,40662	2,85434
3	1,15762	1,19101	19	2,52695	3,02559
4	1,21550	1,26247	20	2,65329	3,20713
5	1,27628	1,33822	21	2,78596	3,39956
6	1,34009	1,41852	22	2,92526	3,60353
7	1,40710	1,50363	23	3,07152	3,81975
8	1,47745	1,59384	24	3,22510	4,04893
9	1,55132	1,68948	25	3,38635	4,29187
10	1,62889	1,79084	26	3,55567	4,54938
11	1,71034	1,89829	27	3,73345	4,82234
12	1,79585	2,01219	28	3,92013	5,11168
13	1,88565	2,13292	29	4,11613	5,41838
14	1,97993	2,26090	30	4,32194	5,74349
15	2,07892	2,39655	31	4,53804	6,08810
16	2,18287	2,54035	32	4,76494	6,45338

The use of this *Table* is plain and easy, for multiplying the figures standing against the number of years, by the given principal, the product is the amount required.

EXAMPLES.

7. What is the amount of 500 dollars for three years, at 6 per cent. compound interest?

1,19101	the tabular number for the time.
500	the principal.
595,50500	

Ans. 595 dols. 50 cents.

8. A merchant, on inspecting some old accounts in March, 1799, finds a settlement dated March, 1771, by which it appears there is due from him to A. B. £.2 8s. this sum he pays with compound interest at 6 per cent. per annum. The amount of it is required.

5,11168	the tabular number for 28 years.
2,4	the principal with the shillings inserted decimally.
2044672	
1022336	
£12,268032	
20	
s. 5,360640	
12	
d. 4,327680	
4	
qrs. 1,310720	Ans. £.12 5s. 4¼d. or 40 dols. 89 cts. 3 ms.

Calculated in Federal Money.

5,11168	
8	dollars.
dols. 40,89344	

Ans. 40 dols. 89 cts. 3 mills, as above.

COMMISSION AND *BROKERAGE.*

COMMISSION and BROKERAGE are compensations to Factors and Brokers for their respective services.

The method of operation is the same as in Simple Interest.

EXAMPLES.

1. What is the commission on £.596 18 4 at 6 per cent.?

596	18	4		Or thus,	£.5	$\frac{1}{20}$	596	18	4
		6							
					1	$\frac{1}{5}$	29	16	11
35|81	10	0					5	19	$4\frac{1}{2}$
20									
16|30							£.35	16	$3\frac{1}{2}$
12									
3|60									
4									
2|40			Ans.	£.35	16	$3\frac{1}{2}$			

2. What is the commission on 1974 dollars at 5 per cent.?

1974	
5	
98,70	Ans. 98 dols. 70 cts.

3. What is the commission on £.526 11 5 at $3\frac{1}{2}$ per cent.? Ans. 18 8 7

4. What is the commission on £.1258 17 3 at $7\frac{2}{5}$ per cent.? Ans. £.93 3 $1\frac{1}{4}$

5. What is the commission on 2176 dols. 50 cents, at $2\frac{1}{2}$ per cent.? Ans. 54 dols. 41 cts. 2 m.

6. The sales of certain goods amount to 1873 dols. 40 cts. what sum is to be received for them, allowing $2\frac{1}{2}$ per cent. for commission, and $\frac{1}{4}$ per cent. for prompt payment of the neat proceeds? Ans. 1821 dols. 99 cts. 9 m.

INSURANCE.

INSURANCE is an exemption from hazard, by paying, or otherwise securing a certain sum, on condition of being indemnified for loss or damage.

Policy is the name given to the instrument, by which the contract of indemnity is effected between the insurer and insured.

Average loss is 5 per cent.; that is, if the insured suffer any loss or damage not exceeding 5 per cent. he bears it himself, and the insurers are free.

RULE. The method of operation as in interest.

EXAMPLES.

1. What is the premium of insuring £.924 at 7 per cent.?
Ans. £.64 13 7

2. What is the premium on 1650 dols. at 12 per cent.?
Ans. 198 dols.

3. What is the premium of insuring 1250 dollars, at 7½ per cent.? Ans. 93 dols. 75 cts.

4. What is the premium of insuring 4500 dollars, at 25 per cent.? Ans. 1125 dollars.

5. What is the premium of insuring 1650 dols. at 15½ per cent.? Ans. 255 dols. 75 cents.

6. What is the premium of insuring 1873 dols. at ½ per cent.? Ans. 2 dols. 34 cts. 1 m.

7. What sum is to be received for a policy of 1658 dols. deducting the premium of 23 per cent.?
Ans. 1276 dols. 66 cts.

8. What sum must a policy be taken out for to cover 1800 dols. when the premium is 10 per cent.?

100 Policy.
10 Premium.

90 sum covered. If 90 : 100 :: 1800 Ans. 2000 dols.
d. d. d.

Proof, 2000 dollars at 10 per cent.
10

200,00

the policy	2000
the premium	200
sum covered	1800 dols.

4. What sum must a policy be taken out for to cover 3928 dols. 7 cents, when the premium is 6 per cent.?

Ans. 4170 dols. 67 cents.

.....

GENERAL AVERAGE.

WHATEVER the master of a ship in distress, with the advice of his officers and sailors, deliberately resolves to do, for the preservation of the whole, in cutting away masts or cables, or in throwing goods overboard to lighten his vessel, which is what is meant by jettison or jetson, is in all places permitted to be done, and a general average, in which all, who are concerned in ship, freight and cargo, are to bear an equal or proportionable part of the loss of what was so sacrificed for the common welfare, and it must be made good by the insurers in such proportions as they have underwritten.

EXAMPLES

OF ADJUSTED AVERAGES.

1. A loaded ship met with such bad weather, that the master and mariners found it impossible to save her without throwing part of her cargo overboard, which they are authorized to do for preservation. Being thus necessitated, they threw such goods as lay nearest at hand, and lightened the ship of 10 casks of hardware, and 40 pipes of Madeira wine, which they judged sufficient to keep her from sinking. Soon after that the ship arrived at her destined port, and then an average bill was immediately made in order to adjust the loss, and to pay the proprietors of those goods, which were thrown overboard, for the good of the whole.

Average accrued to ship ——, for goods thrown overboard for preservation of ship, freight and cargo.

	Dols.
Ship valued at	12000
Freight (wages and victuals deducted)	3000
James Nugent's value of goods	4000
Francis Macnat's value of goods	2500
John Simpson's value of goods	8500
Peter Wilson for 40 pipes of wine	4000
Jonathan Wain for 10 casks of hardware	6000
	40000

	Dols.
Mr. Andrew Wilson's goods, thrown overboard, were valued at	4000
Mr. Laurence Ward ..... do.	6000
	10000

If 40000 give 10000 loss, what loss will 100 give?
Ans. 25 per cent.

The ship must pay to A. W. and L. W. for 12000 dollars, at 25 per cent.	3000
The freight, 3000 dollars, at the same rate	750
Thomas Nugent, for 4000 dollars, at the same rate	1000
Thomas Morgan, for 2500 dollars, at the same rate	625
James Simpson, for 8500 dollars, at the same rate	2125
A. W. and L. W. receive of the owners of the goods saved, and the ship's owners	7500
Their property being insured, the underwriters pay them	2500
	10000

2. The Sea-Horse, capt. Dix, laden with hemp, cordage, and iron, bound from Riga to Boston, ran on shore, coming through the grounds at Elsineur. The captain hired a great number of men, and several lighters, to lighten the ship, and to get her afloat again, which was done; but he was obliged to pay 409 dols. 23 cts. for their assistance. This expense being incurred to preserve both ship and cargo, the average must consequently be general. When the ship arrived at Boston, the captain immediately made a protest and an average bill, which was thus stated:

Average accruing to the ship Sea-Horse from Riga to Boston, in 1799, for assistance in getting off the strand of Elsineur.

	dols.	cts.	
For sundry charges paid at the Sound for lighters and assistance in getting off the ship	409	23	
Protest and postage	35	37	
			444 60
The ship's freight money	3460		
Wages for all the people, 4 ms. and 20 d. 560 } Victuals for ditto .... 300 }			860
			2600

...ERAGE.

	Dols.
... at ...	12000
...	2000
... of hemp ...	18000
... of cordage ...	4000
... of iron ...	2400
	39000

... dollars lose 144 dols. 60 cts. what will 100 dols. lose?

Ans. 1 dol. 14 cts.

	dols. cts.
... wheat 12000 dols. at 114 cts. per 100 dols.	136 80
... 2000 dols. at the same rate ...	29 64
... hats for 18000 ...	205 20
... for 4000 ...	45 60
... for 2400 ...	27 36
	444 60

...ING AND *SELLING STOCKS.*

... in the sense in which it is here used, is a fund ... by government or individuals in a corporate capac... value of which is variable.

EXAMPLES.

... the amount of 1565 dollars national bank ... per cent.?

1565.
134

9260.
...

... Ans. 2097 dols. 10 cts.

... of 2958 dollars bank stock at 23

... Ans. 3697 dols. 50 cts.

	Dollars.			dols. cts.
3.	6959	of 8 per cent. stock, at 110 per cent.	Ans.	7654,90
4.	1796	6	91¼	1643,54
5.	1284	3	54½	696,57
6.	3172	deferred	89	2823,08
7.	1518	state notes	83½	1271,32½
8.	1686	Union Bank	128	2158,08

.....

DISCOUNT

Is the abating of so much money to be received before it is due, as that money, if put at interest, would gain in the same time and at the same rate.

Thus 100 dollars would discharge a debt of 106 dollars payable in 12 months, discount at 6 per cent. per annum, because the 100 dollars received would, if put to interest, regain the 6 dollars discount.

RULE. As 100 dollars, with the interest for the given time, is to 100, so is the given sum to the present worth, and the difference between the present worth and the given sum is the discount.

EXAMPLES.

1. What is the present worth of 450 dollars due in 6 months, discount at 6 per cent. per annum?

$6m.\ \frac{1}{2}\ 6$

3

100

d.

103 : 100 :: 450

Ans. 436 dols. 89 cts.

2. How much is the discount of £.308 15*s.* due in 18 months, at 8 per cent. per annum? Ans. £.33 1 $7\frac{9}{17}$

3. What is the present worth of 5150 dollars due in $4\frac{1}{2}$ months, discounting at the rate of 8 per cent. per annum, and allowing 1 per cent. for prompt payment?

Ans. 4950 dols.

4. A is to pay 5927 dols. on the 19th of April, 1799, and 5989 dols. the 19th of July following—It is required to know how much money will discharge both sums on the 19th of January, 1799, discounting at 8 per cent. per annum?

Ans. 11569 dols. 43 cts.

Though the discount found by the preceding method is thought to be the sum that should be deducted for present payment in justice to both parties, yet in business the interest for the time is taken for the discount.

Examples.

5. What ready money will discharge a note of 150 dollars, due in 60 days, allowing legal interest, or 6 per cent. per annum as discount?

150
1 = half the months.

1,50

150 the debt.
1,50 the interest.

148,50 Ans. 148 dols. 50 cts.

6. Bought goods to the amount of 950 dollars, at 90 days credit, what ready money will discharge it, allowing the interest for the time at 6 per cent. per annum as discount?

Ans. 935 dollars 75 cents, if calculated for 3 months.
935 dollars 95 cents, if calculated for 90 days.

When the interest for the time is allowed as discount, it is presumed that neither party suffers any loss, but the following statement evinces the contrary.

A owes B 100 dollars payable in 12 months, for present payment of which B allows 6 dollars or the interest for the time, and receives 94 dollars; this sum he immediately lends to C for the same space of time, and then receives the amount, being 99 dollars 64 cents, which is 36 cents less than he would have to receive from A, had he left the money in his hands—but if he had allowed A the discount, and not the interest, for the time, he would have received from him 94 dols. 34 cents, and this sum being put to interest, would amount to 100 dollars in one year, which shews that the discount and not the interest, is the just deduction for prompt payment.

But when discount is to be made for present payment, without any regard to time, the interest of the sum, as calculated for a year, is the discount.

EXAMPLES.

7. How much is the discount of 853 dols. at 2 per cent. ?

853
2
dols. 17,06

Ans. 17 dols. 6 cts.

8. How much money is to be received for 985 dols. 75 cts. discounting 4 per cent. ? Ans. 946 dols. 32 cents.

....

BANK DISCOUNT.

The method used among bankers, in discounting notes, &c. is, to find the interest of the sum, from the date of the note to the time when it becomes due, including the days of grace; the interest thus found is reckoned the discount. Thus, if a note for 100 dollars, dated the 2d September, be discounted at a bank, for 30 days, the interest of that sum for 33 days being 55 cents, is deducted for discount. It may be asked, why interest for 33 days is calculated on a note for 30, the answer is, that as custom has allowed the borrower three days of grace—that is, though the time of the note expires on the 1st of October (the day of the date being included in the 30 days) he may withhold the payment till the 4th—it is therefore reasonable that he should pay interest for it.

If a note of 100 dollars were discounted at a bank for 60 days, the interest of that sum for 63 days, being 105 cents, would be deducted for the same reason.

In case payment of a note be not convenient at the proper time, a new note must be presented on the day of discount, immediately preceding the expiration of the time, paying the same discount or interest for the time, as before stated. Thus, a note of 100 dollars, dated October 7th, 1800, for 30 days, though it is not payable till November 8th, yet must be replaced by a new note on Tuesday, November 4th, paying at the same time 55 cents. A note of the same date, for 100 dollars for 60 days, though not payable till Monday, December 8th, (including in this time the days of grace) must be replaced by a new note on Tuesday, December 2d, paying likewise 105 cents. In the former case the borrower sustains a loss of 5

days in 30, and in the latter 7 days in 60 by renewing. All Banks have their stated times of discount, generally once in a week. In the preceding cases, the Bank is supposed to discount on Tuesday. Some Banks discount twice a week—others oftener.

The discount of any sum, discounted for 30 or 60 days, is found by multiplying it by one sixth of the days. [*See interest, page* 110.]

EXAMPLES.

1. How much is the interest of 238 dols. discounted for 30 days?

238
,5½=⅙ of 33 days.
1190
119
1,30,9
Ans. 1 dol. 30 cts. 9 ms.

2. What is the interest of 564 dols. discounted for 60 days?

564
1,0½=⅙ of 63 days.
5640
282
5,92,2
Ans. 5 dols. 92 cts. 2 ms.

What is the discount of the following sums, viz.

	dols.		dols.	cts.	ms.
3.	159 discounted for 30 days.	Ans.	0	87	4
4.	273 ..... do.		1	50	1
5.	683 ..... do.		3	75	6
6.	789 ..... do.		4	33	9
7.	2194 ..... do.		12	06	7
8.	219 discounted for 60 days.	Ans.	2	29	9
9.	187 ..... do.		1	96	3
10.	319 ..... do.		3	34	9
11.	658 ..... do.		6	90	9
12.	2169 ..... do.		22	77	4

13. How much is the discount of a debenture of 319 dollars, payable in 210 days, discounting for 30 days?

NOTE. 28 days are allowed for a month, interest being calculated as if the note were renewable.

28)210(7 mo.
196
14 days

319
,5½=⅙ of 33 days.
159 5
15 9
1,75,4 for 1 month.
7
12,27,8 for 7 months.
14d. ½ mo: 877
13,15,5
Ans. 13 dols. 15 cts. 5 m.

14. What is the discount of the above sum, discounting for 60 days?

NOTE. As notes are renewable in 56 days, the interest of all securities is calculated accordingly.

56)210(3 discount months
168
42 days

319
1,0½=⅙ of 63 days
3190
159
3,34,9 for 1 disc. mo.
3
10,04,7 for 3 ditto
28d. ½ mo. 1,67,4
14 ½ 83,7
12,55,8
Ans. 12 dols. 55 cts. 8 m.

The preceding examples shew the difference between discounting for 30 and 60 days.

What is the discount of the following sums, discounting for 30 days?

	dols.		days.		dols.	cts.	m.
15.	187	for	79	Ans.	2	90	0
16.	219		115		4	94	5
17.	658		47		6	7	4
18.	2169		128		54	53	2

What is the discount of the following sums, discounting for 60 days?

	dols.		days.		dols.	cts.	m.
19.	187	for	79	Ans.	2	76	8
20.	219		115		4	72	2
21.	658		47		5	79	8
22.	2169		128		52	5	4

When a note is offered at a bank for discount, two endorsers are generally required, to the first of whom it is said to be payable: Thus—A having occasion for a sum of money, procures B and C as endorsers to his note, and offers it for discount in the following form:

100 *Dollars.* ——, ——

For value received, I promise to pay B, or order, at the —— Bank, on demand, one hundred dollars, with interest after —— days. A.

When state notes, bank shares, &c. are lodged in a bank as security for monies, a note is presented in this form:

For value received, I promise to pay the President, Directors and Company of the —— Bank, or their order, at said Bank, on demand, —— dollars, with interest after —— days. C. D.

.....

EQUATION OF PAYMENTS.

The design of this Rule is to find a mean time for the payment of several sums due at different times.

Rule. Multiply each sum by its time, and divide the sum of the products by the whole debt; the quotient is accounted *the mean time.*

EXAMPLES.

1. A owes B 200 dollars, whereof 40 dollars is to be paid in 3 months, 60 dollars in 5 months, and the remainder in 10 months, at what time may the whole be paid without any injustice to either?

dols.	*mo.*	
40	× 3	= 120
60	× 5	= 300
100	×10	=1000
200		200)1420

7 months and 3 days.

2. A is indebted to B £.120, whereof one half is to be paid in 3 months, one quarter in 6 months, and the remainder in 9 months, what is the equated time for the payment of the whole? Ans. 5 months and 7½ days.

3. C owes D 1400 dollars, to be paid in 3 months, but D being in want of money, C pays him at the expiration of 2 months, 1000 dollars, how much longer than 3 months ought C, in equity, to defer the payment of the rest? Ans. 2½ months.

Those who are exact in these calculations, find the present worth of each particular sum, then find on what time these present worths will be increased to the total of the particular sums payable at the particular times to come; and that is the true equated time for payment of the whole.

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BARTER

Is the exchanging of one commodity for another on such terms as may be agreed on.

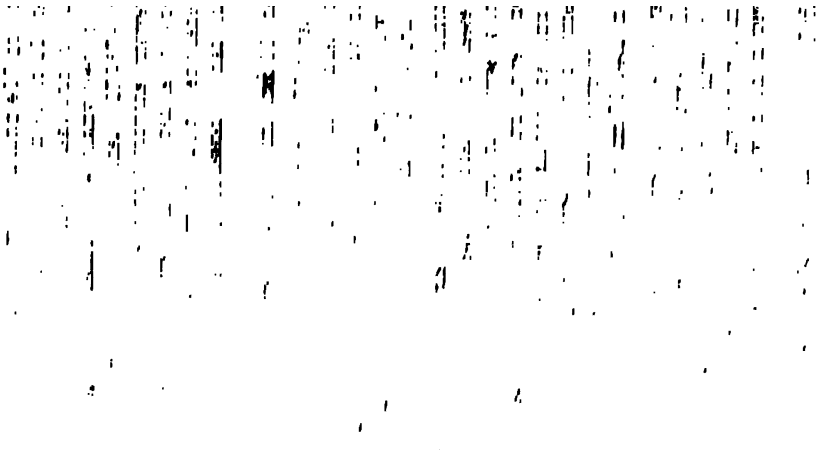
EXAMPLES.

1. How many quintals of fish, at 2 dols. per quintal, will pay for 140 hhds. of salt, at 4 dols. 70 cts. per hhd.?

140
4,70
9800
560

dols. *qtl.*
If 2 : 1 :: 658,00 the amount of the salt.

Ans. 329 quintals.



B in 99 cts. per bushel; how many bushels of wheat is he to receive in barter, and at what price is it to be rated, that their gains may be equal?

Ans. $218\frac{38}{209}$ bushels, at $104\frac{1}{2}$ cts. per bushel.

10. A and B barter some goods—A put his at $30\frac{6}{25}$ shillings, and gains 8 per cent. B puts his at $24\frac{3}{10}$ shillings, and gains at the same rate; what was the first cost of the goods?

Ans. 28*s.* and 22*s.* 6*d.*

11. A and B barter; A has cloth that cost 28*d.* B's cost him 22*d.* and he puts it at 25*d.*; how high must A put his to gain 10 per cent. more than B? Ans. 35*d.*

12. C and D barter—C makes of 7*s.* 6*s.* 8*d.* D makes of 7*s.* 6*d.* 7*s.* 3*d.*; who has lost most, and by how much per cent.? Ans. C loses $1\frac{3}{7}$ per cent. more than D.

.....

LOSS AND *GAIN*

Is a rule that discovers what is gained or lost in buying or selling goods, and instructs merchants and traders to raise or fall the price of their goods so as to gain or lose so much per cent. &c.

EXAMPLES.

1. Bought a piece of broadcloth containing 53 yds. at 4 dols. 65 cts. per yd. and sold at 5 dols. per yd. what is the profit on the whole?

	dols. cts.		yds.
	5		
	4,65		
yd.			yds.
If 1	: ,35	::	53
			35
			265
			159
			18,55

Ans. 18 dols. 55 cts.

2. If 1 lb. of coffee cost 28 cts. and is sold for 31 cts. what is the profit on 3 bags, weighing 293 lbs. neat?

Ans. 8 dols. 79 cts.

3. Bought a piece of lace of 42 yds. for £4 14 6. and sold it at 2s. 4d. per yd. what is the gain or loss on the whole piece ? Ans. 10s. 6d. gain.

4. A merchant bought 20 cwt. 2 qr. 14 lb. of iron, at 11⅔ dollars per cwt. gain freight and charges, 24 dols. what is the gain or loss, if he sells the whole at 17 dollars per cwt. ?
Ans. 33 dols. 20 cts. gain.

5. If a gallon of wine cost 5s. 3d. and is sold for 7s. 2d. what is the gain per cent. ?

7 2
6 8

s. s. £.
If 6 8 : 6 : : 100 Ans. 7½ per cent. gain.

6. When 20 per cent. loss is made on coffee, sold at 20 cents per lb. what was the first cost ? Ans. 25 cents.

7. At 13½ cents profit on the dollar, how much is it per cent. ? Ans. 13½ per cent. or 13 dols. 50 cts. per 100 dols.

8. A trader sells his goods at 2½d. profit on the shilling, how much is it per cent. ? Ans. 20⅚, or £20 16 8

9. Which is the better bargain, in purchasing fish, 17 shillings per quintal, and 4 months credit, or 16s. 8d. cash ?
Ans. They are alike.

Proof. The present worth of 17s. found by discount, is equal to 16s. 8d. and 16s. 8d. with 4 months interest, will amount to 17s.

10. A bought a piece of shalloon, containing 34 yards, at 3s. 4d. per yard, and sold it at 12½ per cent. loss, how much did he sell it per yard ? Ans. 2s. 11d.

11. Bought rum at 90 cts. per gallon, at what rate must it be sold to gain 20 per cent. ? Ans. 108 cents.

12. A trader bought 1 hogshead of rum, of a certain proof, containing 115 gallons, at 1 dol. 10 cts. per gallon, how many gallons of water must be put into it to gain 5 dollars, by selling it at 1 dollar per gallon ? Ans. 16½ gallons.

13. Bought 4 hogsheads of rum, containing 450 gallons, at 1 dollar per gallon, and sold it at 1 dollar 20 cents per gallon, and gave 3 months credit ; now allowing the leakage of the rum while in my possession to be 10 gallons, I would

know the gain or loss, discounting for the present worth of the debt at 6 per cent. per annum? Ans. 70 dols. 19 cts. gain.

14. A vintner buys 596 gallons of wine, at 6*s*. 3*d*. per gallon, in ready money, and sells it immediately at 6*s*. 9*d*. per gallon, payable in 3 months, how much is his gain or loss, supposing he allows the interest for the time, at 6 per cent. per annum, as discount for present payment?

Ans. £.11 17 8 gained.

15. What would be the gain or loss on the aforesaid wine, supposing the discount for present payment to be made at 2 per cent. without any regard to time?

Ans. £.10 17 6½ gain.

16. A merchant bought a parcel of cloth at the rate of 1 dollar for every 2 yards, of which he sold a certain quantity at the rate of 3 dollars for every 5 yards, and then found he had gained as much as 18 yards cost, how many yards did he sell? Ans. 90 yards.

17. Bought rum at 1 dollar 25 cents per gallon, which not proving so good as I expected, I am content to lose 18 per cent. by it, how must I sell it per gallon?

Ans. 1 dol. 2½ cts.

18. H sells a quantity of corn at 1 dollar a bushel, and gains 20 per cent. some time after he sold of the same, to the amount of 37 dollars 50 cents, and gained 50 per cent. how many bushels were there in the last parcel, and at what rate did he sell it per bushel?

Ans. 30 bushels, at 1 dol. 25 cts. per bushel.

19. A distiller is about purchasing 10000 gallons of molasses, which he can have at 48 cents per gallon, in ready money, or 50 cts. with 2 months credit, it is required to know which is more advantageous to him, either to buy it on credit, or to borrow the money at 8 per cent. per annum to pay the cash price? Ans. He will gain 136 dols. by paying the cash.

20. A tobacconist buys 4 hogsheads of tobacco weighing 38 cwt. 2 qrs. 8 lb. gross, tare 94 lb. per hogshead, at 9 dollars per cwt. ready money, and sells it at 11½*d*. per lb. allowing tare at 14 lb. per cwt. to receive two-thirds in cash, and for the remainder a note at 90 days credit; his gain or loss is required, supposing the note is discounted at a bank where discount is made for 60 days. Ans. 283 dols. 43 cts. gain.

THE MEDIAL

are gi-
of those

whole compo-

per lb.
per lb.—

30 quarters of brown malt, at 28s.
40 quarters of pale, at 30s. per quarter, and

24 quarters of high dried ditto, at 25*s.* per quarter; what is the value of 8 bushels of this mixture?

Ans. £.1 8*s.* $2\frac{1}{2}d.\frac{3}{5}$

6. If I mix 27 bushels of wheat, at 5*s.* 6*d.* the bushel, with the same quantity of rye, at 4*s.* per bushel, and 14 bushels of barley, at 2*s.* 8*d.* per bushel, what is the worth of a bushel of this mixture? Ans. 4*s.* $3\frac{3}{4}d.\frac{8}{8}$

7. A grocer mingled 3 cwt. of sugar, at 56*s.* per cwt. 6 cwt. at £.1 17 4 per cwt. and 3 cwt. at £.3 14 8 per cwt. what is 1 cwt. of this mixture worth? Ans. £.2 11 4

8. A mealman has flour of several sorts, and would mix 3 bushels at 3*s.* 5*d.* per bushel, 4 bushels at 5*s.* 6*d.* per bushel, and 5 bushels at 4*s.* 8*d.* per bushel, what is the worth of a bushel of this mixture? Ans. 4*s.* $7\frac{1}{2}d.\frac{4}{12}$

9. A vintner mixes 20 gallons of Port, at 5*s.* 4*d.* per gallon, with 12 gallons of White wine, at 5*s.* per gallon, 30 gallons of Lisbon, at 6*s.* per gallon, and 20 gallons of Mountain, at 4*s.* 6*d.* per gallon, what is a gallon of this mixture worth?

Ans. 5*s.* $3\frac{3}{4}d.\frac{5}{8}$

10. A farmer mingled 20 bushels of wheat, at 5*s.* per bushel, and 36 bushels of rye, at 3*s.* per bushel, with 40 bushels of barley, at 2*s.* per bushel, I desire to know the worth of a bushel of this mixture? Ans. 3 shillings.

11. A person mixing a quantity of oats, at 2*s.* 6*d.* per bushel, with the like quantity of beans, at 4*s.* 6*d.* per bushel, would be glad to know the value of 1 bushel of that mixture?

Ans. 3*s.* 6*d.*

12. A refiner having 12 lb. of silver bullion of 6 oz. fine, would melt it with 8 lb. of 7 oz. fine, and 10 lb. of 8 oz. fine, required the fineness of 1 lb. of that mixture?

Ans. 6 oz. 18 dwt. 16 grs.

13. If with 40 bushels of corn, at 4*s.* per bushel, there are mixed 10 bushels, at 6*s.* per bushel, 30 bushels, at 5*s.* per bushel, and 20 bushels, at 3*s.* per bushel, what will 10 bushels of that mixture be worth? Ans. £2 3*s.*

ALLIGATION ALTERNATE.

Is the method of finding what quantity of any number of simples, whose rates are given, will compose a mixture of a

given rate; so that is the reverse of Alligation Medial, and may be proved by it.

RULE. 1. Write the rates of the simples in a column under each other.

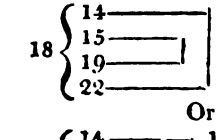
2. Connect or link with a continued line the rate of each simple which is less than that of the compound, with one, or any number, of those that are greater than the compound, and each greater rate with one or any number of the less.

3. Write the difference between the mixture rate and that of each of the simples, opposite the rates with which they are linked.

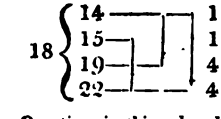
4. Then if only one difference stand against any rate, it will be the quantity belonging to that rate; but if there be several, their sum will be the quantity.

EXAMPLES.

1. A merchant would mix wines at 14*s*. 19*s*. 15*s*. and 22*s*. per gallon, so that the mixture may be worth 18*s*. the gallon; what quantity of each must be taken?



Or thus,



NOTE. Questions in this rule admit of a great variety of answers, according to the manner of linking them.

2. How much wine, at 6*s*. per gallon, and at 4*s*. per gallon, must be mixed together, that the composition may be worth 5*s*. per gallon? Ans. 1 qt. or 1 gall. of each, &c.

3. How much corn, at 2*s*. 6*d*. 3*s*. 8*d*. 4*s*. and 4*s*. 8*d*. per bushel, must be mixed together, that the compound may be worth 3*s*. 10*d*. per bushel?

Ans. 12 at 2*s*. 6*d*. 12 at 3*s*. 8*d*. 18 at 4*s*. and 18 at 4*s*. 8*d*.

4. A goldsmith has gold of 17, 18, 22 and 24 carats fine; how much must he take of each to make it 21 carats fine?

Ans. 3 of 17, 1 of 18, 3 of 22, and 4 of 24.

5. It is required to mix brandy at 8*s*. wine at 7*s*. cider at 1*s*. and water together, so that the mixture may be worth 5*s*. per gallon ?

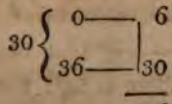
Ans. 9 gals. of brandy, 9 of wine, 5 of cider, and 5 of water.

When the whole composition is limited to a certain quantity.

RULE. Find an answer as before by linking ; then say, As the sum of the quantities, or differences thus determined, is to the given quantity, so is each ingredient, found by linking, to the required quantity of each.

EXAMPLES.

6. How many gallons of water must be mixed with wine worth 3*s*. per gallon, so as to fill a vessel of 100 gallons, and that a gallon may be afforded at 2*s*. 6*d*. ?



36 : 100 :: 6
6
36)600(16
36
240
216
24

36 : 100 :: 30
30
36)3000(83
288
120
108
12

Ans. 83⅓ gallons of wine, and 16⅔ of water.

7. A grocer has currants at 4*d*. 6*d*. 9*d*. and 11*d*. per lb. and he would make a mixture of 240 lb. so that it might be afforded at 8*d*. per lb. how much of each sort must he take ?

Ans. 72 lb. at 4*d*. 24 at 6*d*. 48 at 9*d*. and 96 at 11*d*.

8. How much gold of 15, of 17, of 18, and of 22 carats fine, must be mixed together, to form a composition of 40 oz. of 20 carats fine ?

Ans. 5 oz. of 15, of 17, and of 18, and 25 oz. of 22.

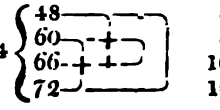
When one of the ingredients is limited to a certain quantity.

RULE. Take the difference between each price and the mean rate, as before; then,

As the difference of that simple, whose quantity is given, is to the rest of the differences severally, so is the quantity given, to the several quantities required.

EXAMPLES.

9. How much wine, at 5*s.* at 5*s.* 6*d.* and at 6*s.* the gallon, must be mixed with three gallons, at 4*s.* per gallon, so that the mixture may be worth 5*s.* 4*d.* per gallon?



10 : 10 :: 3 : 3

10 : 20 :: 3 : 6

10 : 20 :: 3 : 6

Ans. 3 gallons at 5*s.*; 6 at 5*s.* 6*d.*; and 6 at 6*s.*

10. A grocer would mix teas at 12*s.* 10*s.* and 6*s.* with 20 lb. at 4*s.* per lb.; how much of each sort must he take to make the composition worth 8*s.* per lb.?

Ans. 20 lb. at 4*s.*; 10 lb. at 6*s.*; 10 lb. at 10*s.*; and 20 lb. at 12*s.*

11. How much gold of 15, of 17, and of 22 carats fine, must be mixed with 5 oz. of 18 carats fine, so that the composition may be 20 carats fine?

Ans. 5 oz. of 15 carats fine, 5 oz. of 17, and 25 of 22.

POSITION.

POSITION is a rule, which, by false or supposed numbers, taken at pleasure, discovers the true one required. It is divided into two parts, SINGLE and DOUBLE.

SINGLE POSITION

Is, by using one supposed number, and working with it as the true one, you find the real number required by the following

RULE. As the total of the errors is to the given sum, so is the supposed number to the true one required.

PROOF. Add the several parts of the result together, and if it agrees with the given sum, it is right.

EXAMPLES.

1. A shool-master, being asked how many scholars he had, said, If I had as many, half as many, and one quarter as many more, I should have 264; how many had he?

Suppose he had 72
As many 72
½ as many 36
¼ as many 18

198

As 198 : 264 :: 72

72

528
1848

198)19008(96 Answer.
1782

1188
1188

Proof.
96
96
48
24

264

2. A person, after spending ⅓ and ¼ of his money, had 60 dollars left; what had he at first? Ans. 144 dols.

3. A certain sum of money is to be divided between 4 persons, in such a manner, that the first shall have ⅓ of it, the second ¼, the third ⅙, and the fourth the remainder, which is 28 dollars; what was the sum? Ans. 112 dols.

4. A person lent his friend a sum of money unknown, to receive interest for the same, at 6 per cent. per annum, simple interest, and at the end of 5 years he received for principal and interest 644 dollars 80 cents; what was the sum lent?

Ans. 496 dolls.

DOUBLE POSITION

Is, by making use of two supposed numbers, which, if both prove false, are, with their errors, to be thus disposed:

RULE. 1. Place each error against its respective position.

2. *Multiply them* cross-wise.

3. If the errors are alike, that is, both greater or both less than the given number, divide the difference of the products by the difference of the errors, and the quotient is the answer: But if the errors be unlike, divide the sum of the products by the sum of the errors, and the quotient will be the answer.

EXAMPLES.

1. B asked C how much his horse cost; C answered, that if he cost him three times as much as he did, and 15 dollars more, he would stand him in 300 dollars; what was the price of the horse?

dols.		*dols.*
Suppose he cost 90		Suppose he cost 96
3		3
270		288
15		15
285 too lit. by 15 dls.		303 too much by 3 dols.

90 15—

X

96 3+

15	1440	270
3	270	

Sum of the errors 18) 1710 (95 answer

	162	
	90	95
	90	3
		285
		15
		300 proof.

2. Two persons, A and B, have both the same income; A saves one-fifth of his yearly; but B, by spending 150 dollars per annum, more than A, at the end of 8 years finds himself 400 dollars in debt; what is their income, and what does each spend per annum?

Ans. Their income is 500 dollars per annum; also A spends 400, and B 550 dollars per annum.

3. There is a fish whose head is 9 inches long, and his tail is as long as his head and half his body, and his body is as long as the head and tail; what is the whole length of the fish?

Ans. 6 feet.

4. Divide 15 into two such parts, so that when the greater is multiplied by 4, and the less by 16, the products will be equal. Ans. 12 and 3.

5. A man had two silver cups of unequal weight, having one cover to both, 5oz.; now if the cover is put on the less cup it will be double the weight of the greater cup, and put on the greater cup it will be three times as heavy as the less cup: what is the weight of each cup? Ans. 3 oz. less—4 oz. greater.

6. A person being asked, in the afternoon, what o'clock it was, answered, that the time past from noon was equal to $\frac{8}{13}$ of the time to midnight; required the time?

Ans. 36 minutes past one.

EXCHANGE.

EXCHANGE is the paying of money in one place or country, for the like value to be received in another place or country.

There are two kinds of money, viz. Real, and Imaginary.

Real money is a piece of metal coined by the authority of the State, and current at a certain price, by virtue of the said authority, or of its own intrinsic value.

Imaginary money is a denomination used to express a sum of money of which there is no real species, as a *livre* in France, a *pound* in America, because there is no species current, in this or that country, precisely of the value of either of the sums.

Par of Exchange is the intrinsic value of the money of one country compared with that of another country, as one pound sterling is equal to thirty-five shillings Flemish.

Course of Exchange is the current or running price of exchange, which is sometimes above, and sometimes below par, varying according to the occurrences of trade, or demand for money. Of this course, there are tables published daily in commercial cities: thus by Lloyd's List, of 3d. December, 1799, the course of exchange between Hamburgh and London, was 32*s.* 6½*d.* Flemish, per pound sterling, being 2*s.* 5½*d.* *under par*, or loss to London.

GREAT-BRITAIN.

The money of account is pounds, shillings, pence and farthings.

The English Guinea is 21 shillings Sterling.

Weights and measures generally as in the United States.

The United States dollar is equal to 4s. 6d. Sterling.

To change Sterling to Federal money.

RULE. Annex three cyphers to the sum (if pounds only) and multiply it by 4; this product divide by 9, and you have the answer in cents. If there be shillings, &c. the usual method is to reduce it to Massachusetts money, by adding one third to it, and then reduce this sum to Federal.

EXAMPLES.

1. Change £.48 Sterling to Federal.

48000
4

9)192000

21333⅓ cents. Ans. 213 dols. 33⅓ cts.

2. Change £.389 17 4½ Sterling to Federal, exchange at 33⅓ per cent. that is, £.133⅓ Massachusetts for £.100 Sterling.

⅓)389 17 4½ Sterling
129 19 1½ Exchange

519 16 6 Massachusetts

,3)519,825

Cts. 173275 Federal. Ans. 1732 dols. 75 cts.

NOTE. Sterling is changed to Massachusetts money by adding one-third to the sum, and Massachusetts to Sterling by deducting one-fourth from it.

* * * * *

To change Federal Currency to Sterling.

RULE. Work by either of the methods.

EXAMPLES.

Change 1732 dollars 75 cents to Sterling.

First Method.				Second Method.
	1732			1732,75
				,3
4s. $\frac{1}{5}$	346	8		519|825
6d. $\frac{1}{8}$	43	6		20
50 cents		2	3	
25 cents		1	$1\frac{1}{2}$	16|500
Ans.	£.389	17	$4\frac{1}{2}$	12
				6|000

$\frac{1}{4}$)519 16 6 Massachusetts
129 19 $1\frac{1}{2}$ Exchange

Ans. £389 17 $4\frac{1}{2}$ Sterling.

1. What is the Federal amount of an invoice of goods, charged at £.196 14 6 Sterling advancing on it 25 per cent ?

25 $\frac{1}{4}$)196 14 6 Sterling
49 3 $7\frac{1}{2}$ Advance

245 18 $1\frac{1}{2}$
Exchange at $33\frac{1}{3}$ per cent. 81 19 $4\frac{1}{2}$

£.327 17 6 Massachusetts

3)327875

cts. $109291\frac{2}{3}$ Ans. 1092 dols. $91\frac{2}{3}$ cts.

2. The Sterling cost of certain goods being £.60 12 6, what does it amount to in Massachusetts money, advancing on it 50 per cent. ?

60 12 6
50 per cent. advance 30 6 3

90 18 9
Exchange at $33\frac{1}{3}$ per cent. 30 6 3

Ans. £.121 5 0 Massachusetts money.

The mercantile method, with 50 per cent. advance, is to double the Sterling for Massachusetts money; thus,

60 12 6 Sterling.
2

£.121 5 0 Massachusetts, as above.

7. A piece of [illegible] is sold at £[illegible] 15 7 sterling, at 75 per cent. advance in the sterling cost. How much is it in Massachusetts money?

	[illegible]	15	—
Advance at 50	[illegible]	7	10½
25	[illegible]	3	11¼
	[illegible]	15	9¾
Exchange at 33⅓ per cent.	[illegible]	5	3
Ans. £[illegible]	11	4½	Massachusetts money.

The same article, with 75 per cent. advance, is to be sold for the sterling cost in Massachusetts money.

Thus,	32	15	7½ sterling
			2½
	105	19	2
	17	13	2½
£.123	12	4½	Massachusetts money, as above.

8. The sterling cost of certain goods being £214 11 6, how much is it in Federal money, advancing thereon 60 per cent.?

	£214	11	6	
50	107	5	9	advance
10	21	9	1½	
	343	6	4½	
Exchange	114	8	9½	
	457	15	2½	Massachusetts.
	£214	11	6	Sterling
Exchange	71	10	6	
	286	2	0	
50	143	1	0	
10	28	12	2½	
	457	15	2½	Massachusetts

(1) 1525,86½

Dollars 1525,86½ Ans. 1525 dols. 86½ cts.

5. What is the amount of a bill of exchange of £115 14 9 sterling, sold in Boston at 1⅓ per cent. advance?

⅓)115	14	9	Sterling
38	11	7	Exchange
154	6	4	Massachusetts money.

,3)154,317

514,39 Federal.
1½

51439
25719

Cents 771|58

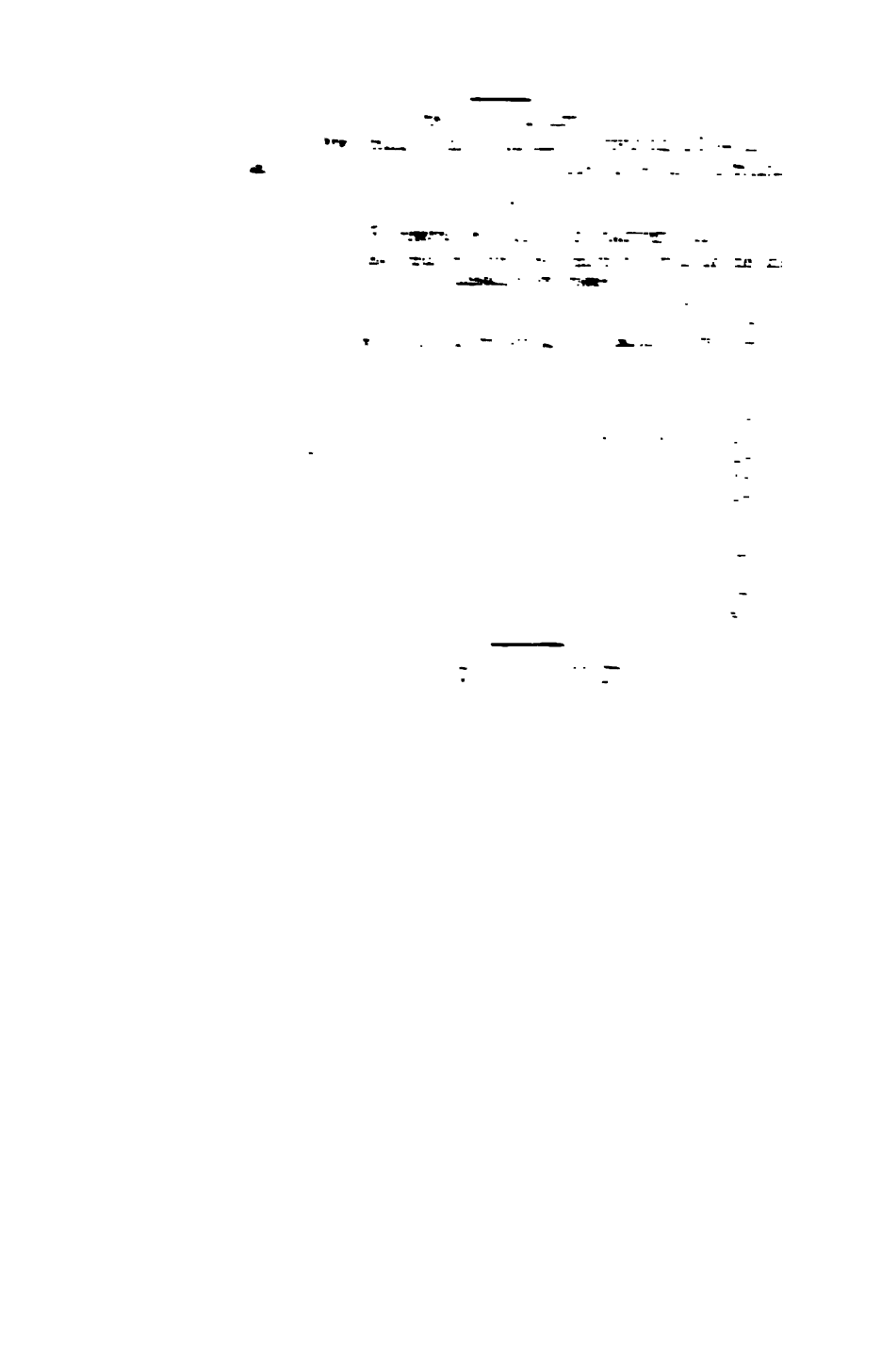
	dols.	cts.
Value at par	514	39
Advance	7	71½
Amount	522	10½

Or thus,

	dols.	cts.
Value at par	514	39
Adv. at 1 pr ct.	5	14 3
½ do.	2	57 1
	7	71 4 adv. at 1½ pr ct.
Amount	522	10 4

6. A merchant in Boston receives a parcel of goods from London, charged in the invoice at the following prices, and marks them for sale at 60 per cent. advance on the sterling cost; required the selling price of each in Massachusetts money?

s.	d.		s.	d.		dols.	c.	m.
13	8	sterling, adv. 60 per ct.	29	1½	Massa. money, or	4	85	3
5	10		12	5½		2	7	3
3	4		7	1½		1	18	3
6	1½		13	0¼		2	17	6
17	0		36	3		6	4	
33	1		70	6½		11	75	6
1	2		2	5½			41	
18	10		40	2		6	69	4
11			23	5½		3	91	
2	4		4	11½			89	3
32	8		68	9½		11	44	4
27	9		59	2¼		9		



and the quotient is the answer in cents. Or, reduce the Irish to Sterling, by deducting $\frac{1}{13}$ from it, and then work as for Sterling.

EXAMPLE.

Change £.278 15 9 Irish money to Federal.

First method.	Second method.
278 15 9	$\frac{1}{13}$)278 15 9 Irish
20	21 8 11 Exchange
5575	257 6 10 Sterling
12	85 15 7½
66909	343 2 5½ Mass
2	
9)13381800	3)343,122
9×13=117 13)1486866	1143,74 cents
114374 cents.	Ans. 1143 dols. 74 cts.

.....

To change Federal money to Irish.

RULE. Multiply the given sum by 117, reject two figures from the product to the right hand, and the remaining figures are the half pence in the given sum.

1. Change 1143 dols. 74 cts. to Irish.

114374
117
800618
114374
114374
2)133817|58.
12)66908¾
2|0)557 5 8
Ans. £.278 15 8¾

If the sum is dollars only, work by either of the following methods.

2. Change 1537 dollars to Irish.

First method. 1537 at 4s. 10½d.				Second method. 1537				
4s.	¼	307	8					
8d.	⅓	51	4	8	461	2		Massachusetts
2	¼	12	16	2	¼ 115	5	6	Exchange at 25 per ct.
½	¼	3	4	0½				
					345	16	6	Sterling
Ans. £.374		12	10½		1/12 28	16	4½	Ex. 8⅓ pr. ct. or 1d. on 1s.
					£.374	12	10½	

In changing Sterling to Irish money at par, $\frac{1}{12}$ is added to the sum for Irish; and in changing Irish to Sterling, $\frac{1}{13}$ is deducted for Sterling, because 12 pence English are equal to 13 pence Irish, making the Exchange 1*d.* in a shilling, 1*s.* 8*d.* in a pound, and £.8 6 8 per cent.

EXAMPLES.

1. Change £.394 17 6 Sterling to Irish, at par, or £.8⅓ per cent.

1/12)394 17 6
32 18 1½

Ans. £.427 15 7½ Irish.

2. Change £.427 15 7½ Irish money to Sterling, at 8⅓ per cent. in favour of England.

1/13)427 15 7½
32 18 1½

Ans. £.394 17 6 Sterling.

3. Change £.370 Sterling to Irish, at 9 per cent.

£. £. £.
100 : 109 :: 370 Ans. £.403 6 0

4. Reduce £.403 6 Irish money to Sterling, at 9 per cent.

9
100

109 : 100 :: £. 403 s. 6 Ans. £.370

HAMBURGH.

Accounts are kept in Hamburgh in Marks, Shillings Lubs or Stivers, and Deniers.

12 deniers, or 2 grotes, make .... 1 shilling lubs, or stiver.
16 shillings lubs, stivers, or 32 grotes ..... } 1 mark.

ALSO,

12 grotes or pence Flemish make 1 shilling Flemish.
20 shillings Flemish ..... 1 pound.

NOTE. 3 marks ..... make ..... 1 rix dollar.
7½ do. ..... 1 pound Flemish.
A shippound in Hamburgh .... 280 lb.
A ring of staves .. do. 240
100 lb. in Hamburgh ..... 107¼ lb. in U. States.
100 ells. .. do. ..... 62½ yards.

The currency of Hamburgh is inferior to the bank money; the *agio*, or rate, is variable; May 14th, 1798, it was 20 per cent. in favour of the bank.

The mark banco is 33⅓ cents; (see laws of the U. States.)

EXAMPLES.

1. Change 12843 marks to Federal, at 33⅓ cts. per mark.

$33\frac{1}{3}=\frac{1}{3})12843$

Ans. 4281 dollars.

2. In 4967 marks 8 stivers banco, how many dollars, exchange as above?

$33\frac{1}{3}=\frac{1}{3})4967,$

$1655,66\frac{2}{3}$
8 stivers $,16\frac{1}{2}$

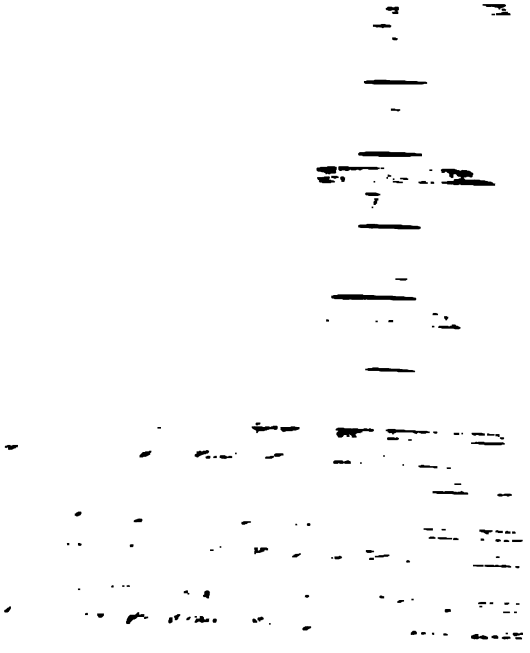
Dols. 1655,83

Ans. 1655 dols. 83 cts.

.....

To change Hamburgh money to Sterling.

RULE. As the given rate is to one pound, so is the Hamburgh sum to the Sterling required.



EXAMPLE.

Change £.350 Sterling to Hamburgh money, exchange at 31*s.* 10*d.* Flemish per pound Sterling.

£.		s.	d.		£.
1	:	31	10	::	350
		12			
		382	grotes		
		350			
		19100			
		1146			
		2)133700	grotes		
		16)66850	stivers		
		4178	2		

Ans. 4178 marks 2 stivers.

Proving the answers in the preceding case will further exemplify this.

.....

To reduce Current to Bank money.

RULE. As 100 marks with the agio added, is to 100 bank, so is the current money to the bank required.

EXAMPLES.

1. Change 560 marks 8 stivers current to banco, agio at 18 per cent.

18
100

118 : 100 :: 560 8. Ans. 475 marks.

2. Change 2366 marks current to banco, agio at 20 per cent. Ans. 1971 marks, $10\frac{2}{3}$ stivers.

3. Change 7456 current marks to banco, agio at 22 per cent. Ans. 6111 marks, 7 stivers.

2. What will 351 lb. of cotton come to at 50*d.* per lb. ?

NOTE. *d.* is the mark for pence Flemish, equal in value to half stivers or half shillings lubs.

lb.		*d.*		*lb.*
1	:	50	: :	351
				50
				2)17550 grotes or pence flemish
				16)8775 stivers
				548 7 Ans. 548 marks, 7 stivers.

3. What will 339 bars Russian iron come to, wt. 19662 lb. at 35½ marks per shippound ?

lb.		*m.*		*lb.*	
280	:	35½	: :	19662	Ans. 2492 *m.* 14 *stiv.*

				m.	*st.*
4.	280	lb. of cotton at	21 grotes per lb.	183	12
5.	4002¼	lb. coffee	8¼ stivers	2063	10
6.	2438	pipe staves	16 marks per ring of 240,	162	9
7.	3540	hhd. ditto	8¼ ditto ditto	125	6
8.	529	barrel ditto	5¼ ditto ditto	11	9
9.	1790	lb. sugar	21¼ pence per lb.	1188	10
10.	4892	lb. rice	18½ marks per 100	892	12
11.	4	pieces 10-4 bedtick	24 ditto	96	0
12.	140	half pint tumblers	8 ditto per 100	11	8
13.	100	boxes window-glass	23 ditto per box	2300	
14.	1526½	lb. coffee	16¼ stivers per lb.	1574	8
15.	245	bars iron, wt. 8434 lb.	41 marks per shippound	1235	
16.	10	bales hemp, wt. 14108 lb.	74 ditto ditto	3728	

17. What is the commission on 18270 marks, at 2½ per cent. ? Ans. 456 m. 12 st.

18. What is the interest of 6370 marks, for three months, at 5 per cent. per annum ? Ans. 79 m. 10 st.

19. Change 5955 marks 7½ stivers to Dutch florins, at 38½ grot. per florin.

	mar.	st.	
	5955	7½	
grotes in a mark =	32	2	grotes a stiver.

11910 15 grotes in 7½ stivers.
17865
15

grotes	38½	190575	grotes
	2	2	
	77)	381150 (	4950 gildens
		308	
		731	
		693	
		385	
		385	

Ans. 4950 gild. or flor.

20. An American merchant orders his correspondent in Amsterdam to remit 4980 florins 16½ stivers to Hamburgh; this being done, when the exchange is 39½ stivers for 2 marks, what sum is he credited for in Hamburgh?

st.	M.	F.	st.
39½	2	4980	16½
4		20	
157		99616½	
		2	
		199233	
		4	

157)796932(5076 marks
785

1193
1099

942
942

Ans. 5076 marks.

HOLLAND.

ccounts are kept in Florins or Gilders, Stivers, Deniers or nings.

8 pennings make 1 grote.
2 grotes, or 16 pennings ....1 stiver.
20 stivers, or 40 grotes .....1 gilder or florin.

ALSO,

12 grotes, or 6 stivers.....1 shilling.
20 shillings, or 6 gilders .....1 pound Flemish.
2½ florins .....1 rix dollar.

he florin or gilder of the United Netherlands is estimated ie United States at 40 cents, or 2 cents per stiver.

100 lb. in Amsterdam make 109½ lb. in the U. States.
100 ells ....do..... 75 yards do.

1 liquid measure, 16 mingles make 1 steckan, 8 steckans 1

.....

. Change 1954 florins to Federal money, at 40 cents per n.

1954
40

dols. 781,60 Ans. 781 dols. 60 cts.

Change 2653 gilders, 17 stivers to Federal money, at ents per gilder.

2653	17	Or thus, 2653	17
40	2		20
106120	34		53077 stivers
34			2 cts. per stiver.
106154 cts.			1061,54

Ans. 1061 dols. 54 cents.

Change 1061 dols. 54 cents to gilders, at 40 cents per gilder.

2)106154 cents

2|0)5307|7 stivers

2653 17 Ans. 2653 gild. 17 stiv.

3. What must be paid in Boston for an invoice of goods charged at 591 florins 17 stivers; allowing the exchange at 40 cents per florin, or 2 cents per stiver, and advancing on it 60 per cent.?

591 17
20

11837 stivers
2

dols. 236,74
60 per cent.

142,0440

	d.	c.
Am. of invoice,	236	74
Advance,	142	04
Ans.	378	78

.....

To change Sterling to Flemish.

RULE. As 1 pound sterling is to the given rate, so is the sterling given to the Flemish required.

EXAMPLES.

1. In £100 10*s.* sterling, how many gilders, exchange at 33*s.* 9*d.* Flemish per pound sterling?

£.	s. d.	£. s.
1 :	33 9	:: 100 10
20	12	20
20	405 grts.	2010
		405
		10050
		80400
	20)81405,0	
	2)4070 2½ grotes	
	20)2035 1½ stivers	
	1017 11½	Ans. 1017 gild. 11½ s

.....

To change Flemish to Sterling.

RULE. As the given rate is to £1 sterling, so is the Flemish given to the sterling required.

EXAMPLE.

Change 1017 gilders 11½ stivers to sterling, exchange at 33*s.* 9*d.* Flemish per £. sterling.

s.	*d.*		£.		*fl.*	*st.*
33	9	:	1	: :	1017	11½
12					40	2
405 grotes					40680	22½
					22½	

405)40702½(100
405

202½
20

405)4050(10
4050

Ans. £100 10

To change Current Money to Bank.

RULE. As 100 gilders with the agio added, is to 100 bank, so is the current money given to the bank required.

EXAMPLE.

Change 823 gilders, 9⅗ stivers current money into bank, agio at 4½ per cent.

g.		*g.*		*g.*	*s.*
104½	:	100	: :	823	9⅗
20				20	
2090				16469⅗	
				100	

2090)1646920(788 gilders.

To change bank money into current.

RULE. As 100 gilders bank is to 100 with the agio added, so is the bank money given to the current required.

EXAMPLE.

Change 788 gilders bank money to current, agio at 4½ per cent.

g. *g.* *g.*
100 : 104½ : 788 Ans. 823 gilders, 9⅗ st.

PRACTICAL QUESTIONS.

1. What will 1867 lb. of coffee come to at 19 stivers per lb

1867
19

16803
1867

2|0)35547|3 stivers.

1773 13 Ans. 1773 gilders, 13 stiv.

2. What will 92 hhds. of sugar come to, weighing 1042 lb. gross, deducting 2 per cent. for good weight, tare 18 p cent. at 21 grotes per lb. ?

104242
deduct 2 per cent. 2085

102157
tare 18 per cent. 18388

83769 nt. wt.
21

83769
167538
---
2)1759149 grotes

2|0)87957|4½ stivers

43978 14½
Ans. 43978 gilders 14½ stivers.

3. What will 251 bars of iron come to, weighing gr 10364 lb. at 9¾ gilders per 100 lb. deducting 2 per cent. ?

10364
9¾

93276
5182
2591

1010,49
20

9,80
16

12,80

	g.	s.	p.
2 pr. ct. = $\frac{1}{50}$) 1010	9	12	
	20	4	3
Ans. 990	5	9	

4. What will 143 steckans 2 mingles of brandy come to, at 42 gilders per aum?

8)143

17 7 2
42

34
68

4 steckans	1/2	21		
2	1/4	10	10	
1	1/8	5	5	
2 mingles	1/8	0	13	2
		751	8	2

Ans. 751 gilders 8 stiv. 2 pennings.

			gild.	st.
5.	21315 lb. of sugar	23 grotes per lb.	12256	2
6.	56560	25	35350	
7.	27093	25½	17271	15
8.	8189 lb. coffee	23¼ stivers	9622	1
9.	4650	28½	5405	12
10.	1970	19½	1945	7
11.	39285	21¼	41740	6
12.	212 ells linen, 208 payable	30	312	
13.	4190 lb. butter	13 gild. per 40 lb.	1361	15
14.	6476	11½	1861	17
15.	2012 lb. lead	13½ do. per 100 lb.	271	12
16.	214 steck. 11 ming. brandy	42 do. per aum	1127	2

.....

DENMARK.

Accounts are kept in Danish current dollars and skillings, reckoning 96 skillings to the dollar.

The course of exchange on London in September, 1799, was 5 rix or Danish dollars for 1 pound sterling.

The rix dollar of Denmark is estimated at 100 cents—(see Laws of the United States.)

96 pounds of Denmark make 100 pounds in the U. States.

Their weights are shippounds, lispounds and pounds—

16 pounds ..... make ..... 1 lispound.

20 lispounds, or 320 pounds .... 1 shippound.

1. How much will 8 pieces of plattillas come to, at 9 dols. 50 skills. per piece?

8

Ans. 76 dols. 64 skills.

2. How much will 1918 bars of iron come to, weighing 263 shippounds 9 lispounds and 4 pounds, at 15 dollars per shippound?

lb.	*d.*	*s.*	*lis.*	*lb.*
320 :	15 : :	263	9	4
		20		
		5269		
		16		
		31618		
		5269		
		84308		
		15		
		126462	0	

320)126462(395

96

304
288

166
160

62
32

30
96

32)2880(90
2880

Or,

		ship.	
		263	
		15	
lis.		3945	
5	½	3	72
4	⅛	3	00
4*lb.*	1/16	0	18
		Ans. 3951	90

Ans. 3951 dols. 90 sk.

3. What is the commission on 21545 Danish dollars, 13 skillings, at 2 per cent. ?

21545 13
2

430,90 26
96

566
810

86,66 Ans. 430 dols. 86 skillings.

4. What will 4 hhds. of sugar come to, weighing gross 4314 lb. tare 17 per cent. at 22 skillings per lb. ?

Ans. 820 dols. 62 skills.

		dols.	*sks.*	*dols.*	*sks.*
5.	4 pieces table cloth	3	80	15	32
6.	50	9	56	479	16
7.	13	17	64	229	64
8.	24	12	....	288	00
9.	50	15	....	750	00
10.	100 coils cord. wt. 62*sh.* 16*l.* 2*lb.* 30 per ship'd.			1884	18
11.	85 bun. cl. hemp 250	36		9000	00
12.	1951 bars Rus. iron 362	8 10	14	5074	3

13. How many Danish dollars will be received in Copenhagen, for a bill of £2300 on London, exchange at 5 rix dollars per pound sterling ? Ans. 11500 dols.

14. A bill is drawn in Copenhagen for 18574 marks, 7 stivers, Hamburgh money, when the exchange is 128 Danish dollars for 100 rix dollars in Hamburgh, how many Danish dollars does it amount to ?

NOTE. Three marks are equal to 1 rix dollar.

m.	*r.d.*	*m.*	*st.*	*r.d.*	*sk.*
If 3	: 1	:: 18574	7 :	6191	46

r.d.	*D.d.*	*r.d.*	*sk.*	
If 100	: 128	:: 6191	46	Ans. 7925 Dan. dols. 6 sk.

2. What will [illegible] pieces [illegible] at 200 copecs per piece?

[illegible]

Ans. [illegible] rub. 25 cop.

4. What is the commission on 3256 rubles 33 copecs, at 3 per cent.?

3256,33
3
97.68,99 Ans. 97 rubles 68 copecs.

					rub.	cop.
6.	4097½	arsheens fleins	24	rub. per 50 arsh.	2393	80
6.	1700	do. drillings	34	copecs per arsh.	578	
7.	355	do. ticking	100	do. do.	355	
8.	118¼	do. do.	110	do. do.	130	62
9.	200 pieces of sail cloth		21	rub. per piece	4200	
10.	2101	poods 25 lb. hemp	31	do. per barquit	6515	04

11. How many rubles must be received in Petersburgh for a bill of 15500 gilders on Amsterdam, when the exchange is 30 stivers per ruble?

St.		Cop.		Gild.		
As 30	:	100	: :	15500	Or thus, ⅓)15500	
				20		5166,66⅔
				310000 stivers		10333,33⅓
				100		
			3|0)3100000|0			
				10333,33⅓	Ans. 10333 rub. 33⅓ cop.	

12. A bill of £.3000 Sterling is drawn on London, exchange at 31¼*d.* Sterling per Ruble, what is its value in Petersburgh?

d. *rub.* £.
As 31¼ : 1 :: 3000
4 20
127 60000
12
720000
4
127)2880000(22677 rubles.
254
340
254
860
762
980
889
910
889
127)2100(16 copecs
127
830
762 Ans. 22677 rub. 16 cop.
68

Two cyphers are annexed to the remainder instead of multiplying by 100 copecs.

.....

FRANCE.

12 deniers = 1 sol, 20 sols = 1 livre.

The crown of exchange is 3 livres tournois.

A livre tournois of France is estimated at 18½ cents in the United States.

NOTE. The word *tournois* is applied to the money of France, as sterling is to the money of England.

French money, exclu

)
3

2400
12

292800
8

2342400
3
---
141)7027200(49838 livres
564

1387
1269

1182
1128

540
423

1170
1128

42
20
---
141)840(5s.
705

135
12
---
141)1620(11d.
141

210
141

69

Ans. 49838 liv. 5 sol. 11 den.

2. Change £.400 sterling to French money, exchange at 17½*d.* sterling per crown of 3 livres. Ans. 16225 liv. 7*s.* 0⅔*d.*

3. Change 4224 livres tournois to sterling, exchange at 17½*d.* per crown of 3 livres.

liv. *d.* *liv.*
3 : 17½ :: 4224
17½

29568
4224
2112

3)73920

12)24640

2|0)205|3 4

102 13 4

Ans. £.102 13*s.* 4*d.*

Or, Take ⅓ of the given sum to reduce it to crowns, and multiply by the rate of exchange; the product will be the answer in pence.

⅓)4224 livres

1408 crowns
17½

9856
1408
704

12)24640 pence

2|0)205|3 4

£.102 13 4 as above.

4. Change 49838 livres 5*s.* 11⅔*d.* to sterling, exchange at 17⅜*d.* sterling per crown. Ans. £.1220.

5. What will 2434 velts of brandy come to, at 320 liv. per 29 velts? Ans. 26857 liv. 12

4. What is the freight of 3302½ veltes, at 9 livres per ton of [illegible]?

Ans. 247 liv. 15 s. 9 d.

5. What is the commission on 36591 liv. 2 s. 4 den. at 2½ [illegible]?

Ans. 914 liv. 15 s. 6 den.

6. What is the interest of 6647 liv. 10 s. 9 den. for 1 [illegible] at ½ per cent. per month?

[illegible] 10 9

[illegible] 5 4

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] 5 11

[illegible] 5 5

7. What is the amount of [illegible] livres, for 28 days, at ½ per [illegible] per month?

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

16 5 6 for one month.

15 days ½ 3 2 9
10 .... ½ 5 3 6
3 .... ½ 1 12 6

Ans. Liv. 15 3 9

The present money of account in France is in francs and centimes or hundredths.

In Nov. 1800, an English guinea was worth 25 fr. 75 cent.
At Spa ..... 5 do. 53 do.

To change francs to livres tournois.

RULE. Multiply the francs by 81 and divide by 80 for livres.

EXAMPLE.

Change 3756 francs to livres.

3756
81
3756
30048
8,0)30423,6
3802 76
20
8,0)152,0
19 Ans. 3802 liv. 19 sols.

To change livres tournois to francs.

RULE. Multiply the livres by 80, and divide the product by 81 for francs.

EXAMPLE.

Change 5469 livres to francs.

5469
80
81)437520(5401,13
405
325
324
120
81
390
324
260
243
17 Ans. 5401 fr.

To change sols and deniers to centimes.

RULE. Take one half of the sols and deniers, as if they were integers, this half is the number of centimes required.

EXAMPLES.

	sols.	den.	sols.	den.	sols.	den.	sols.	den.	
Change	4	5	12	2	6	5	16	6	to centimes.
Ans.		25		61		54		83	centimes.

When there is a remainder in dividing the sols, it is to be carried to the deniers, and reckoned 10 and not 12; add this 10 to the deniers, and take one half of the sum for the remaining centimes.

EXAMPLES.

	sols.	den.	sols.	den.	sols.	den.	
Change	5	8	15	4	19	6	to centimes.
Ans.		29		77		98	centimes.

If the number of deniers be 10 or 11, they are to be reversed, and in place of them you are to add 1 to the number of sols preceding, and then annex a cypher to it; one half of this is the centimes required.

EXAMPLES.

	sols.	den.	sols.	den.		sols.	den.	
Change	1	10	7	11	and	15	10	to centimes.
		2)20		2)80			2)160	
Ans.		10		40			80	centimes.

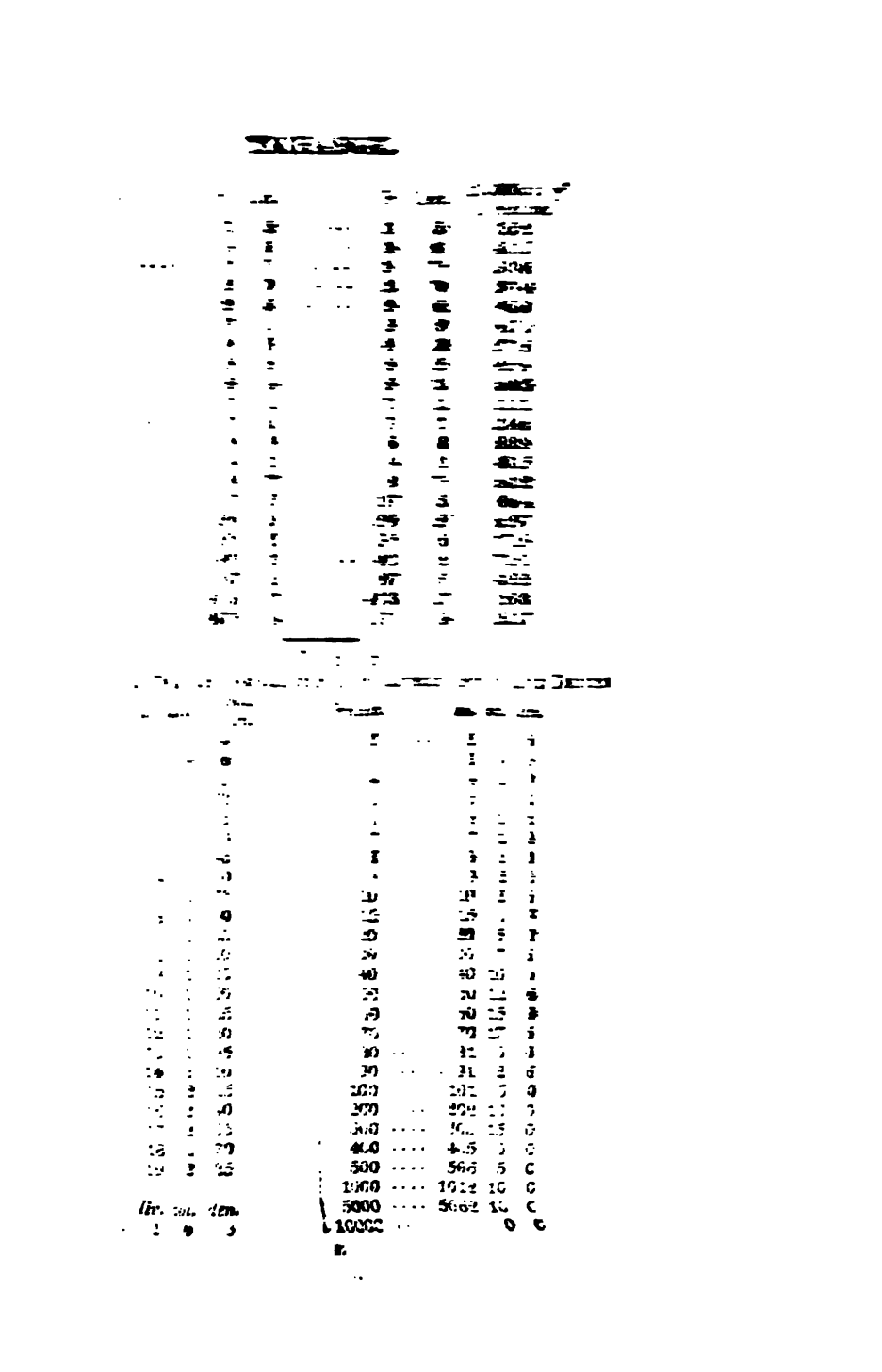
Sols and deniers are reduced to centimes by the preceding rule, and though the result is not accurate, yet from its simplicity and conciseness it is generally used.

TABLES

FOR CHANGING LIVRES, SOLS AND DENIERS TO FRANCS AND CENTIMES.

[N. B. The first is sufficiently exact for business; in the second the answer is calculated to the ten-thousandths part of a centime.]

	TAB. I.		TAB. II.		
Deniers.	*Fr.*	*Cent.*	*Fr.*	*Cent.*	*10,000ths of a centime.*
1	0	0	0	0	4115
2	0	1	0	0	8230
3	0	1	0	1	2346
4	0	2	0	1	6461
5	0	2	0	2	0576
6	0	2	0	2	4691
7	0	3	0	2	8807
8	0	3	0	3	2922
9	0	4	0	3	7037
10	0	4	0	4	1152
11	0	5	0	4	5267
Sols.					
1	0	5	0	4	9383
2	0	10	0	9	8765
3	0	15	0	14	8148
4	0	20	0	19	7531
5	0	25	0	24	6914
6	0	30	0	29	6296
7	0	35	0	34	5679
8	0	40	0	39	5062
9	0	44	0	44	4444
10	0	49	0	49	3827
11	0	54	0	54	3210
12	0	59	0	59	2593
13	0	64	0	64	1975
14	0	69	0	69	1358
15	0	74	0	74	0741
16	0	79	0	79	0123
17	0	84	0	83	9506
18	0	89	0	88	8889
19	0	94	0	93	8272
Livres.					
1	0	99	0	98	7654
2	1	98	1	97	5309
3	2	96	2	96	2963
4	3	95	3	95	0617
5	4	94	4	93	8272
6	5	93	5	92	5926
7	6	91	6	91	3580
8	7	90	7	90	1235
9	8	89	8	88	8889
10	9	88	9	87	6543



SPAIN.

SPANISH reckonings are of two sorts—
Money of plate, distinguished *hard* or *plate* dollars, &c.
Money of vellon, distinguished by *current* dollars.
The former is $88\frac{4}{17}$ per cent. above the latter.
100 reals plate being equal to $188\frac{4}{17}$ reals vellon.
100 reals vellon ..... $53\frac{1}{8}$ do. plate.
17 reals plate ..... 32 do. vellon.
17 piasters or current dollars 256 do. do.
4 maravadies make 1 quarto, $8\frac{1}{2}$ quartos or 34 maravadies 1 real.
The peso, piaster, or current dollar of 8 reals plate, passes at 15 reals vellon in trade, but in exchange it is estimated at 15 reals vellon 2 maravadies.
The ducat of exchange is 375 maravadies.
The real plate, is estimated 10 cents, and the real vellon at 5 cents, in the United States.
The Spanish arobe, is 25 lb.
100 lb. of Spain is 97 lb. English.

.....

To change reals vellon to reals plate.

RULE. Multiply the given sum by 17, and divide by 32 for reals plate.

EXAMPLE.

Change 800 reals vellon to reals plate.

800
17
---
32)13600(425,
128

80
64

160
160

Ans. 425 reals plate.

To change reals plate to reals vellon.

RULE. Multiply the given sum by 32, and divide by 17 for reals vellon.

EXCHANGE.

EXAMPLE.

A [illegible] plate, how many reals vellon?

425
32

850
[illegible]

[illegible]
3

Ans. 800 reals vellon.

[illegible] reals vellon, *to Federal money.*

[illegible] by 10, and the reals vellon [illegible] the given sum.

[illegible]

[illegible] in Federal money.

[illegible]
[illegible]

Ans. 1425 dols. 90 cts.

[illegible] in Federal money.

[illegible]
[illegible]

Ans. [illegible] dols. 63 cts.

[illegible]

[illegible] of plate dollars, reals [illegible]

[illegible] make ..... 1 real vellon.
[illegible] ..... 1 dollar of plate.

[illegible] these accounts it reals plate and maravedies, [illegible] maravedies to 1 rea. plate.

To bring real plate to dollars.

Multiply the given sum by 32, and divide by 17 real vellons, and divide the reals vellon by 20 for dollars.

EXAMPLE.

In 320 reals plate how many hard dollars?

320
32
640
960
17)10240(602 reals vellon
102
40
34
6
8½

17)51(3 quartos.

51

2|0)60|2 reals vellon
dol. 30 2 3

Ans. 30 dol. 2 r.v. 3 q.

To change hard dollars to reals plate.

RULE. Multiply the dollars by 20 for reals vellon, and the reals vellon being multiplied by 17 and divided by 32 give the reals plate required:—Or, Multiply the dollars by $10\frac{5}{8}$ for reals plate.

EXAMPLE.

In 16 hard dollars how many reals plate?

16
20
320
17
2240
320
32)5440(170
32
224
224

Or thus,

16
$10\frac{5}{8}$
160
10
170 R. P.

16
5
8)80
10

Ans. 170 reals plate.

PRACTICAL QUESTIONS,

The answers to which are in *dollars, reals vellon, and quarto.*

1. What will 4[illegible] pipe staves come to at 80 piastres of [illegible] dollars per M. or 1200?

[illegible]

Ans. [illegible] hhds. 0 r. 1 q.

				D.	R.	Q.
2.	[illegible]00 barrel staves at 30½ piastres per 1200			417	3	7
3.	[illegible]00 hhds. do.	40	do. do.	30	2	3
4.	[illegible] casks sherry wine	30	do. per cask	45	3	4

The result of the following is in rials plate, and maravadies.

5. In 610 hard dollars, how many rials plate.

610
20 rials vellon = 1 hard dollar

12200
17

85400
12200

32)207400(6481
192

154
128

260
256

40
32

8 Ans. 6481 r.p. 8 mar.

6. What will 2632 barrels of flour come to, at 11 current dollars per barrel ?

2632
11

28952 piastres or current dollars
8 rials plate = 1 piast. or current dol.

Ans. 231616 rials plate.

7. 88 lasts of white dry salt, at 6 piastres per last.

88
6

528
8

4224 Ans. 4224 rials plate.

8. Change £.600 sterling to rials plate, exchange at 36¼ sterling per piastre.

600
20
12000
12
144000
4
576000 (3972 current dollars
435 8
1410 31776
1305 3 10
1050 31779 10
1015
350
290
60
8
145)480(3 rials
435
45
34
180
135
145)1530(10 maravadies
145
80 Ans. 31779 rials plate 10 mar.

36¼

9. In £.3200 sterling, how many rials plate, exchange 36¼*d.* sterling per piastre? Ans. 169489 r. plate 22 mar.

N. B. In St. Lucar accounts are kept in Rials plate and Quartos, *quartos to 1 rial plate.*

BILBOA.

Accounts are kept in Rials vellon and Maravadies, 34 maravadies making 1 rial.

To change piastres or current dollars to rials plate.

RULE. As 1 current dollar is to 15 rials 2 maravadies, so is the given sum to the rials required; or, multiply the sum by 15 rials 2 maravadies, for rials.

EXAMPLE.

In 5000 current dollars, how many rials vellon?

$2=\frac{1}{17}$)5000 Or thus, 5000

15 2=1 c.dol. 2

25000 34)10000

5000

294 4 294 4

75294 4 Ans. 75294 r. vel. 4 mar.

.....

To change current dollars to sterling.

RULE. As 1 dollar is to the rate of exchange, so is the given sum to the sterling required.

EXAMPLE.

In 5000 piastres or current dollars, how many pounds sterling, exchange at $36\frac{3}{8}$*d.* per dollar?

	p.		d.		p.		
As	1	:	$36\frac{3}{8}$	::	5000		
					$36\frac{3}{8}$		
					180000		5000
					1875		3
					12)181875		8)15000
					2|0)1515|6 3		1875
				Ans.	£.757 16 3		

To change sterling to current dollars.

Rule. As the rate of exchange is to 1 dollar, so is the given sum to the dollars required.

EXAMPLE.

In £ [illegible] sterling, how many current dollars, exchange at [illegible]d. sterling per dollar?

				£.	s.	d.	
As	[illegible]	:	1	::	750	10	3	Ans. 5000 cur. dols. or piast.

* * * * * *

To change sterling to rials vellon.

Rule. As the rate of exchange is to 15 rials 2 maravedies, so is the given sum to the rials required.

EXAMPLE.

In £ 436 10s. sterling, how many rials vellon, exchange at 36¼d. sterling per current dollar?

	£.	r. m.		£. s.
As	36¼	: 15 2	::	436 10
	8			20
	291			8730
				12
				104760
				8
	2 mar. = 1/17			838080
				15 2
				4190400
				838080
				49298

291)16820498(57869
1164
980
873
1074
873
2019
1746
2738
2619
119
34 mar. = 1 rial.
291)4046(13

Or, 838080
2
34)1676160 mar.
49298 rials.

Ans. 49869 rials 13 mar.

PRACTICAL QUESTIONS.

1. What will 122 quintals of fish come to, at 136 rials per quintal?

122
136
732
366
122
Ans. 16592 rials.

2. What is the cranage of 1137 quintals of fish, at 10 maravadies per quintal? Ans. 334 *R.* 14 *M.*

PORTUGAL.

Accounts are kept in Millreas and Reas, reckoning 1000 reas to 1 millrea of 5*s.* 7½*d.* sterling, or 1 dol. 25 cts. in the United States.

A vinten is 20 reas, and 5 vintens is a festoon of 100 reas.

1. Change 579 millreas 740 reas to Federal, at 1 dol. 25 cts. pr. millrea.

		M.	*R.*
579,740	Or thus,	579,740	
1,25	¼ added	144,935	
2898 700	Dollars	724,675	
69568 80			
Cents 72467,500	Ans.	724 dols. 67½ cts.	

2. Change 724 dols. 67½ cts. to millreas, at 1 dol. 25 cts. per millrea.

1,25)724,675(579 mill. 740 reas.

Or, deducting ¼ from the sum in Federal money gives the millreas, &c.

Example. ¼)724,675
144,935
579,740 as before.

3. Change 579 millreas 750 reas to sterling, at 5s. 7½d. per millrea.

579,750
67½

40582250
34785,00
289,875

£ 39133.125

20)3261 1

Ans. £.163 1 1⅛

4. In £.163 1 1⅛ sterling, how many millreas, at 5s. 7½d. per millrea?

s.	d.		reas.		£.	s.	d.
5	7½	:	1000	: :	163	1	1⅛

Ans. 579 mill. 750 reas.

5. What is the commission on 6245 mill. 46 reas, at 2½ per cent.?

6245,046
2½ per 1,00

12490092
3122523

156,12615 Ans. 156 mill. 126 reas.

6. Suppose a cargo is sold for 6245 millreas, at two months credit, for prompt payment of which ½ per cent. per month is allowed: how much is the discount?

2)6245

31,225 for 1 month.
2

Ans. 62,450 for 2 months.

Or thus,

½ per cent. for 2 months = 1 per cent.

6245
1

62,45

7. Suppose you import 5960 hogshead staves and 5060 barrel staves, on which there is a duty of 23 per cent. which is taken in kind, how many of each remain for sale?

Ans. 4590 hhd. and 3897 bbl.

		M. R.	M. R.
8.	702 barrels of flour at	8,600 per bbl.	6037,200
9.	4590 hhd. staves	,030 per stave	137,700
10.	3897 bbl. do.	,020 per do.	77,940
11.	71 alquiers of beans	,480 per alquier	34,080

Measures of Portugal.

Cloth Measure.

A vara is 43⅛ inches English.
A covedo is 26⅔ ditto.

Wine Measure.

1 almude is 12 canados.
1 canado is 4 quarteels.
An almude is 4½ gallons English wine measure.
A canado is 3 pints English.

Corn Measure.

1 moy is 15 fangas.
1 fanga is 4 alquiers.
1 moy of 60 alquiers is 3 English quarters, or 24 bushels, Winchester measure.
1 quarter is 20 alquiers.
1 English bushel is 2½ alquiers in Lisbon, 2 alquiers in Oporto, and 2⅔ alquiers in Figuiras.
A moy of salt is the same measure as corn.
A pipe of coals is 16 fangas.
1 fanga is 8 alquiers.
A pipe of coals is 128 alquiers, which at 2½ alquiers per bushel, is 51½ bushels English.

Weights of Portugal.

1 quintal is 4 arobes.
1 arobe is 32 pounds, so that a quintal is 128 lb. Portugal weight, which is equal to about 132 lb. English, avoirdupois weight.
A pound is about 16½ ounces English.

Loss *by exchanging English money in Portugal.*

An English guinea passes at Lisbon for 3 m. 600 r. which is 134 reis, or 9 pence less than the value.

An English crown passes for 800 reas, which is 89 reas, or 6 pence less than the value.

An English shilling passes for 160 reas, which is 18 reas, or about 1½ penny less than the value.

.....

LEGHORN.

Accounts are kept in Piastres, Soldi, and Denari, reckoning 12 deniers to 1 soldi, and 20 soldi to 1 piastre or dollar of 48*d.* sterling at par.

1½	paul, or 2 sols, are equal to	1 livre.
6	livres	1 piastre or dollar.
5½	livres (effective money)	1 do.
1	ducat	1⅛ do.

Weights—A pound is only 12 ounces in all commodities.

145 lb. is said to be equal to the English quintal of 112 lb.; but fish generally renders about 136 to 138 lb. per quintal.

145 lb. in Leghorn	make	112 lb. in the U. States.
4 brasses		1 cane.
100 brasses		64 yards, U. States.
1 palm		9½ inches, do.

4 sacks are two per cent. less than an English quarter, of 8 bushels.

.....

1. How much will 5630 lb. of ginger come to, at 9 piastres per 100?

5630
9
506|70
20
14|00 Ans. 506 piast. 14 sol.

2. What will 9760 lb. of pepper come to, at 27½ ducats per 100?

9760
27½
68320
19520
2440
1/6)265960
44326⅔
piast. 3102|86⅔
20
soldi 17|33⅓
12
den. 4|00 Ans. 3102 piast. 17 sol. 4 den.

3. What will 143700 lb. of pitch come to, at 26 pauls per 100?

NOTE. 1 paul is equal to ⅘ of a livre.

143700
26
862200
287400
37362,00 pauls
2
3)74724
6)24908 livres
4151 6 8
Ans. 4151 piast. 6 sol. 8 den.

4. How much will 4200 sacks of wheat come to, at 26 livres, effective money, per sack?

4200
26
25200
8400
liv. *piast.*
5⅔ : 1 :: 109200 livres.
Ans. 18991 piast. 6 sol. 8

			piast.	s.	d.
5.	100 barrels pork	16 piast. per barrel	1600	0	0
6.	1000 do. flour	10½ do.	10500	0	0
7.	2660 lb. coffee	26 da. per 100	691	12	0
8.	6578 lb. pimento	18 do. ...do.	1184	0	9
9.	9370 lb. rice	24 liv.cur.money pr. 100,	374	16	0
10.	97270 lb. logwood	16 piast. per 1000	1556	6	4
11.	4170 lb. Russia wax ..	33⅓ ducats per 100	1629	15	6
12.	104060 lb. sugar	30 piast. per 151lb.....	20674	3	5
13.	3330 lb. loaf sugar	30 do. per 100	1005	0	0
14.	1000 casks tar	4½ do. per cask.	4500	0	0
15.	100000 staves	4 do. per 100	4000	0	0

.....

NAPLES.

Accounts are kept in Ducats and Grains, reckoning 100 grains to 1 ducat.

The current coins are grains, carlins, ducats, dollars, and ounces.

10 grains make 1 carlin; 10 carlins 1 ducat; 3 ducats 1 ounce.

The Naples dollar passes for 120 grains, and the Spanish dollar for 126 grains.

100 lb. Naples weight are equal to 64⅝ lb. English.

Brandy is sold per cask of 12 barrels, or 132 gallons; 60 karafts make a barrel.

Sewing silks are sold per lb of 12 ounces.

Lustrings are sold per cane of 84 inches.

Sugar, coffee, fish, and tobacco are sold per cantar, of 196 lb. in the United States.

The cantar is subdivided into 100 rotolas of 33 ounces each.

---

1. What is the amount of 10 casks 6 barrels 29 karafts of brandy, at 92 ducats per cask?

		92		
		10		
		920		
6 bbl.	½	46		
20 kar.	1/18	2	55	
5 do.	¼		64	nearest
4 do.	⅕		51	
		969	70	Ans. 969 ducat. 70 grains.

2. What is the amount of 2 casks of clayed sugar, weighing neat 10 cantars 51 rotolas, at 65 dollars per cantar?

rot.	*dols.*	*rot.*			
100 :	65	:: 1051	Or thus,	65	
		65		10	
		5255		650	
		6306	50 rot. $\frac{1}{2}$	32	50
			1 do. $\frac{1}{50}$		65
	duc.	683,15			
			duc.	683	15

Ans. 683 ducats 15 grains.

3. How much is the amount of 1 box of scented soap, containing 100 parcels of 16 ounces each, at 22 grains per rotola?

100
16

oz.	*gr.*		
33 :	22	:: 1600 *oz.*	: Ans. 10 ducats 66 grains.

4. What is the commission on 996 ducats, at 2 per cent.?

Ans. 19 ducats 92 grains.

	cant.rot.		*ducats.*		*duc.gr.*
5.	3 73	of coffee	73	per cantar	272 29
6.	16 19½	soap	21	.....	340 14
7.	1 59	do.	21	.....	33 39
8.	7 97½	do.	21	.....	167 62
9.	67½	scented ditto	30	.....	20 25
10.	52	white ditto	17	.....	8 84
11.	7 64	raisins	12	.....	91 68
12.	2 casks 11 bbls. 4 karaf.	of brandy	102	per cask	298 06
13.	..... 10 do. 43	do. ditto	92	do.	82 16
14.	..... 9 do. 12	do. ditto	92	do.	70 53
15.	355 canes of silk	.....	2 50	per cane ..	887 50

SMYRNA.

Accounts are kept in piastres and hundredths, except the English accounts, which from ancient custom are kept in piastres and eightieths or half paras.

The fractional parts are sometimes called aspers, 100 aspers to 1 *piastre.*

The following calculations are made in piastres and hundredths.

A piastre is equal to 40 paras, and a Spanish dollar to 136 paras.

340 piastres are equal to 100 Spanish dollars.

The exchange on London was 13 piastres for 1 pound sterlings May 14th, 1800.

Their weights are the Rotola, Oke, Cheque and Tiffee—

A rotola	marked *Ro.* is	180 drams.
An oke	% is	400 do.
A cheque of opium	is	250 do.
do. of groat's wool	is	800 do. or 2 okes.
A tiffee of silk	is	610 do.

100 rotolas, or 1800 drams, or 45 okes are a quintal of this country.

112 lb. English should render here $40\frac{3}{4}$ okes, or $90\frac{5}{9}$ rotolas.

45 okes of this country render $123\frac{3}{4}$ lb. English.

A pike is 27 inches nearly.

* * * * * *

To change piastres to dollars.

Rule. Multiply the piastres by 5, and divide the product by 17, for cents.

Example.

Change $1277\frac{55}{100}$ piastres to dollars.

1277,55
5

17)6387,75(375,75
51

128
119

97
85

127
119

85
85

Ans. 375 dols. 75 cts.

To change dollars to piastres.

RULE. Multiply the dollars by $8\frac{2}{3}$ for piastres.

EXAMPLE.

Change 375 dols. 75 cts. to piastres.

375,75
$8\frac{2}{3}$

1127,25
75,15 } for $\frac{2}{3}$
75,15 }

Ans. piast. 1277,55

* * * * * *

PRACTICAL QUESTIONS.

1. How much will 10 serons of cochineal come to, weighing neat 724 okes 73 rotolas, at 80 piastres per oke?

724,73
80

Ans. piast. 57978,40

2. 299 bags of sugar, weighing 506 quintals 96 rotolas, tare 14 rotolas per bag, at 110 piastres per quintal.

gross	506 96	299
tare	41 86	14
neat	465 10	1196
	110	299
Ans. piast.	51161 00	100)4186
		41 86

3. 4 cases of opium, weighing gross 1026 rotolas, tare oke 3 rotolas, at 210$\frac{3}{4}$ piastres per cheque.

Notes. 1 rotola is equal to $\frac{1}{44}$ of an oke, and 1 oke to 2 rotolas.

gr.	1026	
	2	
	2052 rot.	
gross okes	481 [illegible]	
tare	94 75	
net okes	376 95	376 95
	$1\frac{1}{2}$	3
	376 95	5)1130 85
	226 17	226 17
cheques	603 12	
	$10\frac{3}{4}$	
	6031 20	
	301 56	
	150 78	
Ans. piast.	6483 54	

4. 893 pieces of copper, neat okes 19743,85, at $\frac{70}{400}$ of paras per oke.

	O. R.
	19743,85
	70
	4|0)13820695|0
Ans. piast.	34551,73

5. What is the custom-house duty on 19740 okes of copper at $\frac{2\frac{1}{2}}{40}$ agio $2\frac{1}{2}$ per cent. ?

NOTE. The charges are all established by a tariff of the Levant Company.

19740.
$2\frac{1}{2}$
39480
9870
40)49350
agio $2\frac{1}{2} = \frac{1}{40}$)1233,75 amount of duty at $2\frac{1}{2}$ parus
30,84 agio at $2\frac{1}{2}$ per cent.
Ans. piast. 1264,59.

6. English consulage on 430 quintals, at $5\frac{1}{2}$ piast. agio 7 per cent. ?

430
$5\frac{1}{2}$
2150
215
2365
7
Ans. piast. 165,55.

7. Custom-house duties on 88 quintals 90 rotolis, at $\frac{2\frac{1}{2}}{110}$ agio $2\frac{1}{2}$ per cent.

88,90
20
110)1778,0
$2\frac{1}{2} = \frac{1}{40}$)16,16
,40
Ans. piast. 16,56.

8. What will the following charges amount to, viz. porterage $\frac{8}{40}$, house porters $\frac{4}{40}$, weighing $\frac{2}{40}$, chan duty $\frac{2}{40}$, visiting and marketing $\frac{1}{40}$ per quintal on 438 quintals?

porterage	8	438
house porters	4	17
weighing	2	
chan duty	2	4|6)744|6
visiting	1	
	17	Ans. piast. 186,15.

.....

ENGLISH WEST-INDIES.

Accounts are kept in Pounds, Shillings and Pence.

.....

JAMAICA AND *BERMUDAS.*

The Spanish dollar passes at *6s. 8d.*; three dollars are equal to 20 shillings, or 1 pound, Jamaica currency.

To change Jamaica currency to Federal.

RULE. Multiply the pounds by 3 for dollars. If there be shillings, &c. increase the pence in the given sum by $\frac{1}{4}$ for cents.

EXAMPLES.

1. When lumber is sold in Jamaica at £.15 per M. how much is it in Federal money?

15
3

Ans. 45 dollars.

2. Change £.54 12*s.* 11*d.* Jamaica currency to Federal.

54 12 11
20

1092
12

4)13115
3278¾

163,93¾ cts. Ans. 163 dols. 93¾ cents.

3. What will 102,896 feet of boards come to, at £.15 per M. ?

102,896
15
514480
102896
£.1543,440
20
s. 8,800
12
d. 9,600 Ans. £.1543 8 9

4. What will 5 hhds. of sugar come to, weighing 8519 lb. neat, at 70 shillings per 100 lb. ?

8519
70
2|0)596|3,30
Ans. £.298 3 3

5. How much will 5 hhds. of sugar come to, weighing 9106 lb. neat, at 75 shillings per 100 ?

9103
75
45515
63721
2|0)682|7,25
Ans. £.341 7 3

.....

BARBADOES.

The Spanish dollar is 6*s.* 3*d.* Barbadoes currency.

To change Barbadoes currency to Federal.

RULE. Increase the pence in the given sum by one-third for cents.

EXAMPLE.

Change £.49 11 10 Barbadoes money to Federal.

£.49 11 10	Proof $\frac{1}{3}$)15869$\frac{1}{3}$	cents.
20	3967$\frac{1}{3}$	
991	12)11902	pence
12	2|0)99|1	10
3)11902	£.49 11 10.	
3967$\frac{1}{3}$		
158,69$\frac{1}{3}$	Ans. 158 dols. 69$\frac{1}{3}$ cents.	

Other calculations as in Jamaica.

.....

MARTINIGO, TOBAGO, AND *ST. CHRISTOPHERS.*

These islands being inhabited by French and English, the former keep their acounts in Livres, Sols, and Deniers, and the latter in Pounds, Shillings, and Pence.

A *current* dollar	is	8*s.* 3*d.*
A *round* dollar	passes for	9*s.*

When payment of freight or goods is mentioned in Spanish dollars, disagreement respecting their value has frequently arisen; and to prevent it, some persons distinguish them by round and current dollars; others mention the *bits* to each. But the most certain way is to specify the number of shillings or livres, instead of dollars, thus A sells to B a barrel of flour, at 99 shillings or livres; in payment B may allow him 11 dollars at 9 shillings each, or 12 dollars at 8*s.* 3*d.* each, either being equal to 99 shillings or livres, the sum specified by their agreement.

.....

FRENCH WEST-INDIES.

Accounts are kept in Livres, Sols, and Deniers.

12 deniers make 1 sol, and 20 sols 1 livre.

The Spanish dollar passes in some places for 8 livres 5 sols, and in others for 9 livres.

1 cwt, or 112 lb. in the United States is equal to 104 lb. French.
100 lb. French are equal to 108 lb. nearly, in the United States.

When any commodity is to be marked in French weight 4 per cent. is added to the neat hundreds; thus a hogshead of fish weighing neat 10 cwt. is marked 1040 lb. Fish shipped from the United States will answer to the weight thus marked, provided it comes out in good order, and the *cask* weighs exactly the customary tare, which is 10 per cent.

100 lb. of coffee or cotton, bought in the French islands, will, or ought to weigh 108 lb. (it will often weigh 110 lb.) in the United States; and as these articles are sold here per lb. there is a gain of 8 to 10 per cent. in the weight. But on sugar, which is bought for 100 lb. and sold here per 112, there is a loss of 6 per cent. because there is 4 per cent. between the American cwt. and 100 lb. French, and 2 per cent. difference in the tare. The tare on brown sugar in the French islands being 10 per cent. and the American tare 12 per cwt. The loss on clayed sugar is greater, occasioned by the customary tare, which is but 7 per cent. in the French islands, whereas it is here 12 per cent. the same as on brown sugar.

NOTE. The tare allowed on sugar among merchants is 12 per 112; that allowed by the custom-house is 12 per 100. [See Tare and Tret, page 95.]

* * * * * *

1. Change 10692 livres to dollars, at 8¼ livres per dollar.

8¼	10692	
4	4	
33)	42768	(1296
	33	
	97	
	66	
	316	
	297	
	198	
	198	

Ans. 1296 dollars.

2. Change 7713 livres to dollars, at 9 livres per dollar.

9)7713

Ans. 857 dollars.

[illegible] at [illegible] livres each, how many livres?

[illegible]

[illegible] livres each, how many livres?

[illegible]

What will [illegible] lb. of coffee come to at 15 sols per lb.

[illegible]

Ans. [illegible] liv. 10 sols.

1780 lb. cotton at 157 livres 10 sols per 100 lb.

	1780	
	157	
	12460	
	8900	
	1780	
10 sols ½	850	
liv.	2803|50	
	20	
sols	10|00	Ans. 2803 liv. 10 sols.

7. 24 barrels of beef at 101 liv. 1 sol 3 deniers per barrel.

liv.	*s.*	*d.*	
101	1	3	
		6	
606	7	6	
		4	
2425	10	0	Ans. 2425 liv. 10 sols.

8. How many dollars, at 8 livres 5 sols per dollar, will pay for 12 hhd. of brown sugar, weighing 13365 lb. at 40 livres per 100 lb.?

13365.
40

8¼	5346,00	
4	4	
33	21384	(648 dollars.
	198.	
	158	
	132	
	264	
	264	

9. A cargo, amounting to 12536 dollars in the United States is sold at 12½ per cent. advance on the invoice; how many livres will it amount to, estimating the dollar at 8¼ livres each?

12½ = ⅛) 12536 invoice
1567 advance

14103 amount
8

112824 livres at 8 per dollar
5 sols ¼ 3525¾

Ans. 116349¾ livres at 8¼ per d

			sols	d.		liv.	s	d.
10.	6 hhds. coffee, weighing	4471 lb.	at 14	6	per lb.	3241	9	6
11.	14 do. sugar .. do. ..	16477 ..	38	liv.	per 100	6261	5	2
12.	1 bale of cotton do. ..	227 ..	150	....	do. ..	340	10	0
13.	94 hhd. fish .... do. ..	101313 ..	33	....	do. ..	33433	5	9
14.	16 casks of rice do. ..	6575 ..	40	10	.. do. ..	2662	17	6
15.	1390 hoops		480	....	per M.	667	4	0
16.	15059 feet of boards		100	.....	do. ..	1505	18	0
17.	48 shaken hhd. with heads		7	15	per hhd. ..	372	0	0
18.	29 barrels of beef		90	15	per bbl.	2631	15	0
19.	6759 velts of molasses		26		per velt	8786	14	0
20.	32670 gals. do. at 73½ 7s. 9d.		per tierce of 60 gals.			39939	9	10

.....

SPANISH WEST-INDIES.

Accounts are kept in Havanna, Laguira, Vera Cruz, &c. in dollars and rials, reckoning 8 rials to a dollar.

The Spanish arobe is 25 lb.

1. What will 123 pieces Bretagnes come to, at 26 rials per piece?

123
26

738
246
---
8)3198
---
399 6 Ans. 399 dols. 6 rials.

2. 21784 feet boards, at 45 dollars per thousand.

21784
45 per M.

108920
87136

980|280
8

2240 980 dols. 2 rials.

3. 153 cases gin, at $8\frac{6}{8}$ dollars per case.

153
$8\frac{6}{8}$

1224
4 rials....76 4
2 do. 38 2

1338 6 Ans. 1338 dols. 6 rials.

4. What is the commission on 14792 dollars 5 rials, at 4 per cent. ?

14792 5
4

591|70 4
8

5|64 Ans. 591 dols. 5 rials.

5. What will 42 barrels of white sugar come to, weighing gross 415 arobes 18 lb. tare and tret on the whole 858 lb. at 26 rials per arobe ?

ar. *lb.*
415 18
858 lb. make 34 8

381 10
26

2286
762
10 lb. = $\frac{8}{5}$ arobe 10

8)9916 rials.

1239 4 Ans. 1239 dols. 4 rials.

		dols.	*rials.*
6.	125 pieces bretagnes at 26 rials	406	2
7.	500 do. .... do. .... $24\frac{1}{2}$ do.	1531	2
8.	80 umbrellas ..... $6\frac{1}{2}$ dollars.....	520	0
9.	147 arobes of butter .. 25 do. per 100 lb.	918	6
10.	2405 arobes 19 lb. sugar 25 rials per arobe	7518	0
11.	*1660 do. ..12 .. do. ..21 do.....do.....*		
12.	*16695 feet boards ..... 40 dols. per M. ..*		

EAST-INDIES.

CALCUTTA.

Accounts are kept in Rupees, Annas, and Pice.

12 pice make 1 anna, 16 annas 1 rupee.

By the *bazar*, or market exchange, for June, 1797, the exchange was, viz.—

100 English guineas were equal to 956 rupees 4 annas.
100 Spanish dollars were equal to 212 rupees.

In Weights—16 chittacks make 1 seer, 40 seers 1 maud.

The factory maud .... is .... 75 lb. English.
The bazar maud..... is .... 84 ditto.

The imports are sold by the factory maud and current rupees.
The exports are bought by the bazar maud and sicca rupees.
100 sicca rupees are equal to 116 current rupees.
Bednah, tin-plates, and hides are sold per corge, 20 to a corge.
The cavid is half a yard English.

1. What will 3905 dry hides amount to, at 12 rupees pet corge?

h.		*r.*		*h.*
20	:	12	::	3905
				12
				2|0)46860
				2343

Ans. 2343 rupees.

2. How much will 189 bazar mauds 31 seers 8 chittacks of sugar come to, at 6 rupees per maud?

		189	31	8
		6		
		1134		
20 seers	$\frac{1}{2}$	3		
10	$\frac{1}{4}$	1	8	
1	$\frac{1}{10}$	0	2	4
8 chit.	$\frac{1}{2}$	0	1	2
		1138	11	6

1138 r. 11 a. 6 p.

BOMBAY.

Accounts are kept in Rupees, Quarters, and Rees.

100 rees make 1 quarter; 4 quarters 1 rupee.

218 rupees were equal to 100 Spanish dollars, in April, 1800.

The current money is in Mohurs, Rupees, and Pice.

50 pice make 1 rupee; 15 rupees 1 mohur.

The weights are pounds, mauds, and candies; the pound the same as English.

A Bombay maud is 28 lb.

A Surat maud is 37½ lb.

21 Surat mauds or 784 lb. make 1 Surat candy.

Cotton is sold by the Surat candy.

Camphire and Mocha coffee are sold by the Surat maud.

Malabar pepper is sold by the Bombay candy of 588 lb.

In 274 bales of cotton, weighing neat 996 cwt. 2 qrs. 23 lb. how many Surat candies?

784 lb. = 7 cwt.

7)996 2 23

142	200	two hundreds
	24	excess 12 per cent.
	56	2 quarters
	23	
	303	Ans. 142 can. 303 lb.

* * * * * *

MADRAS.

Accounts are kept in Pagodas, Fanams, and Cash.

80 cash make 1 fanam; 36 fanams 1 pagoda.

The Spanish dollars were in 1798 and '99, at 165 dollars for 100 star pagodas; making the pagoda worth 165 cents. The revenue laws of the United States reckon them at 184 cents.

The Bengal, or Sicca (new) rupee is worth 46 to 47 cents. The revenue laws of the United States value them at 50 cents.

The current exchange is 340 Sicca rupees, for 100 Star[illegible]

A lack of rupees is 100,000.

Cowries are sea shells used as small money in India, and on the coast of Africa, to make change among the natives in the bazar, or market, and in payment to the coolies or labourers. In May, 1792, a rupee was worth 5120 cowries. The common cowries are generally at 5 to 7 rupees per Bazar maund, the better sort from 10 to 14 rupees per maund, the price varying according to the kind.

The peicul is 133⅓ lb. English.

100 cattys make a peicul.

A maund is 25 lb. Troy. 20 maunds make 1 candy.

The excellence of their cloth is defined by the *threads* in the warp.

The duty payable at the custom-house is 2½ per cent. outwards and inwards. This is taken on imports according to the invoice, and on exports at the actual cost at the bazar or market.

.....

BATAVIA.

Accounts are kept in Rix Dollars and Stivers.

The rix dollar	is	48 stivers.
The ducatoon	is	80 ditto.
The Spanish dollar	is	60 ditto; sometimes it passes at 60 stivers.

125 lb. Dutch are equal to 133⅓ lb. English.

125 lb.	make	1 pecul.
100 cattys	.....	1 ditto.

1. In 1333 rix dollars 16 stivers, how many ducatoons?

1333 16
48

10670
5333

8|0|6400|0

Ans. 800 ducatoons.

2. What will 127477 cattas of bar iron come to, at 9 rix dollars per picul ?

	cat.	r.d.	cat.
As	100	: 9	: : 127477
			9
			11472,93
			48
			744
			372
			44,64

Ans: 11472 rix dols. 44 stiv.

3. What will 3894 bottles of wine come to, at 36 stivers per bottle ?

	3894		
24 stiv.	½ 1947		
12	¼ 973	24	
	2920	24	

Or thus, 36 stiv. = ¾ rix dol.

3894	
3	
4)11682	
2920	24

Ans. 2920 rix dols. 24 stiv.

4. In 31478 lb. of sugar how many piculs ?

125)31478(251	
250	
647	
625	
228	
125	
103	

Ans. 251 piculs 103 lb.

5. In 50632 lb. how many piculs ? Ans. 405 pic. 7 lb.

6. 12648 ..... 101. 23

7. What will 279 piculs 25 lb. of sugar come to, at 7½ rix dollars per picul?

279
7½
1953
139 24
25 = ½ 1 24
2094 00 Ans. 2094 rix dols.

CHINA.

Calculations are made in Tales, Mace, Candareens, and Cash.

10 cash .... make .... 1 candareen.
10 candareens ..... 1 mace.
10 mace ..... 1 tale.

The tale of China is estimated at 1 dollar 48 cents in the United States.

The Spanish dollar is current at 72 candareens.

Weights are in Tales, Piculs, and Cattas—

16 tales make 1 catta; 100 cattas 1 picul.

A picul is equal to 133⅓ lb. English.

The cavid of China is 14 $\frac{2}{10}$ inches; it is divided into 10 parts.

To change pounds English to Cattas.

RULE. Deduct 25 per cent. or one quarter, for cattas.

EXAMPLE.

In 62668 lb. English, how many cattas?

$\frac{1}{4}$)62668
15667.

Ans. 47001 cattas.

To change cattas to pounds English.

RULE. Add one third for pounds English.

EXAMPLE.

In 47001 cattas how many lb. English?

$\frac{1}{3}$)47001
15667

Ans. 62668 lb. English.

.....

PRACTICAL QUESTIONS.

1. What is the amount of 308 chests of bohea tea, weighing neat 101956 lb. at 15 tales per picul?

$\frac{1}{4}$)101956 lb.
25489

cat. : *tal.*
100 : 15 :: 76467 cattas
15

382335
76467

11470,05 Ans. 11470 tales 5 cand.

2. What will 75 chests of souchong tea come to, weighing neat 4875 lb. at 44 tales per picul?

$\frac{1}{4}$)4875
1218$\frac{3}{4}$

3656$\frac{1}{4}$ cattas
44

14624
14624
11

1608,75 Ans. 1608 tal. 7 ma. 5 cand.

3. How many dollars will pay for an invoice of tea, amounting to 6446 tales 1 mace 6 candareens ?

72)6446 1 6(8953
576
686
648
381
360
216
216 Ans. 8953 dols.

.....

MANILLA.

Accounts are kept in Dollars, Rials, and Quartos.

12 quartos make 1 rial; 8 rials 1 dollar.

The arobe is 25 lb. 5½ arobes make 1 picul.
Their 100 lb. is equal to 104 lb. English.

1. What will 1897 bags of sugar amount to, weighing neat 1361 piculs 1 arobe 17½ lb. at 6 dollars per arobe ?

1361 1 17½
6
8166

1 ar.	½	1	1½
12½ lb.	½		4¾
5	⅓		1¼
		8168	0

Ans. 8168 dollars.

	pic.	*ar.*	*lb.*	*dol.*	*ri.*		*dol.*	*r.*
2. 118 bags of sugar, weighing	89	1	22½	at 5	7	Ans.	524	6
3. 663 do. .. do.	469	3	18		6		2819	

COLUMBO, ISLE OF CEYLON.

The money is in paper, silver, and gold.

Paper money is in the bills of the Company, and is of uncertain value.

Silver is in the rupees of different parts of India.

The Sicca rupee is worth more than any other by 7 to 8 per cent.

Gold is the Mohur pagoda.

The exchange is various, as silver is rarely seen.

6 stivers make ..... 1 shilling Flemish.
8 shillings ..... 1 rix dollar.
30 stivers ..... 1 rupee.
64½ do. ..... 1 Spanish dollar.

.....

JAPAN.

Accounts are in Tales, Mace, and Candareens.

10 candareens make 1 mace.
10 mace ..... 1 tale = ¾ of a dollar, or 75 cents.
Ten mace are equal to 1 rix dollar.
Six tales make a corban, a gold coin not used in accounts.

In Weights--10 tales make 1 mace; 16 mace 1 catta.

The ichan or hickey is 3½ feet.
The balee is 65 quarts.

Thirty-five per cent. was the duty on privileged imports in 1799. It is on the exports (which are all free of duty) that the Dutch make their profit upon their return to Batavia. A privilege is granted to the captain of the Dutch ships to carry money, which often sells at an advance.

How much is the neat proceeds of 4 silver watches, at 35 tales each, deducting the duty of 35 per cent.?

35 tales
4

140
35 per cent.

700	Sales	140
420	Duty	49
49,00	Ans. neat proceeds	91 tal

Form of an Account of Sales.

	tales.	Duties. *tales.*	Neat. *tales.*
4 silver watches, 1st kind	55	49	91
6 silver watches, 2d kind	23,1	48,5,1	90,0,9

The article is given in the first column, the price in the next column, the duties in the third, and the neat proceeds in the fourth.

.....

PARTICULARS

Of the Tonnage *of* Goods, *as calculated to make up the Tonnage for the Freight of Goods, brought in East-India or China ships to Europe*—viz.—

PIECE GOODS.

Fort St. George.	*Pieces to the Ton.*	Bengal.	*Pieces to the Ton.*
ALLEJARS	800	Cambrics	R.400
Betelles	400	Chucklaes	400
Callawapores	800	Cushtaes	800
Chints of all sorts	R.400	Cossaes	400
Ginghams	800	Charconnaes	600
Izarees	800	Cuttannees	R.800
Longcloths	160	Doosooties	R.400
Moorees	800	Dungaries	R.400
Sallampores	400	Doreas	400
Sastracundies	800	Dimities	600
		Diapers, broad	400
Bengal.		Ditto narrow	600
Addaties	700	Elatches	R.800
Alliballies	400	Emmerties	600
Allachaws	1200	Gurrahs	400
Allibannies	R.800	Ditto, long	200
Arras	R.400	Ginghams, coloured, ..	600
Atchabannies	800	Humhums	400
Baftaes	R.400	Habassies	600
Bandannoes, or Taffa de Foolas	R.800	Humhums, quilted	100
Carridarries	600	Jamdannies	800
Callipatties	400	Jamwars	600
Coopees	600	Laccowries	600
Callicoes	400	Lungees Herba	800
Chillaes	600	Mulmuls	400
Chowtars	600	Ditto handkerchiefs ..	400
Chunderbannies	800	Mahamodietes	400
Chinachures	R.800	Mamoodies	R.400

PIECE GOODS.

BENGAL.	Pieces to the Ton.
Nillaes	800
Nainsooks	400
Peniascoes	800
Photaes	R.800
Percaulas	800
Putcahs	R.400
Romals	R.800
Sannoes	400
Seerbetties	400
Seerbands	600
Seersuckers	600
Seerbandconnaes	400
Seershauds	R.400
Seerbafts	400
Shaulbafts	400
Succatoons	R.800
Sooseys	400
Sorts	400
Taffaties of all sorts ..	R.800
Tanjeebs	400
Tepoys	R.800
Terrindams	400
Tainsooks	400
BOMBAY.	
Annabatches	R.400
Bombay stuffs	R.400
Byrampauts	400
Bejutapauts	R.400
Boralchawders or brawls ..	1200
Betellees	400
Chelloes	R.400
Chintz of all sorts	R.400
Dooties	R.400
Guinea stuffs, large ..	600
Ditto, small	1200

BENGAL.	Pieces to the Ton.
Longcloths, whole pieces ..	160
Ditto, half ditto	320
Lemanees	R.800
Musters	400
Nunsarees	R.400
Neganepauts	400
Niccanees, large	600
Ditto small	600
Salampores	400
Stuffs brown	R.400
Tapseils, large	400
Ditto, small	600
CHINA.	
Nankeen cloth .. —	R.4'0
Silks of all sorts — —	R.800
China ware, 50 cubical feet to the ton, or about 4 chests of the usual dimensions.	
Other measurable goods, 50 cubical feet to the ton.	

N. B. Where the letter R. is set against pieces of 400 to the ton, it shews those goods are to be reduced, or brought to a standard of 16 yards long and 1 broad.

Where against pieces of 800 to the ton, to 10 yards long and 1 broad.

EXAMPLE.

1000 pieces of 12 yards long and $1\frac{1}{2}$ broad, at 400 to the ton, make 844 pieces, or 2 tons 44 pieces.

1000 pieces of $10\frac{1}{2}$ yards long and $1\frac{1}{2}$ broad, at 800 to the ton, is 1181 pieces, or 1 ton 381 pieces.

WEIGHABLE GOODS.

	Cwt. to the Ton.		Cwt. to the Ton.
Arrangoes	20	Cassia Buds	12
Aloes	16	Camphire	15
Benjamin	20	Cotton Yarn, Fine Goods	10
Borax	20	Cowries .... Gruff ditto	20
Cardemons, fine goods	12	Coffee .... Fine do.	18
Cakelack	16	Cinnabar	10
Carmenia Wool	10	Cloves	12
Cambogium	20	Dragon's Blood	
Cassia Lignea	8	Gum Arabic	

WEIGHABLE GOODS.

	Cwt. to the Ton.		Cwt. to the Ton.
Gum Elemi	16	Rice	20
Ammoniacum	16	Shellack	16
Opoponax	16	Seedlack	18
Sagapenum	18	Sticklack	16
Sarcocol	18	Salt-Petre	20
Indigo	12	Senna	8
Iron Kintlage	20	Sago	16
Musk	20	Ditto, packed in China ware	—
Myrrh	16	Tutenague	20
Mother-of-Pearl Shells	20	Turmeric	16
Nux Vomita	15	Tincal	16
Pepper	16	Tea, Green	8
Quicksilver	20	Bohea	10
Rhubarb	8	Arrack Gauge gallons	251
Raw Silk	10	Canes Tale	300
Ditto in chests	8	Wanghees and Bamboes	3000
Ditto in bales or bundles	10	Rattans equal to 16 cwt.	6000
Redwood	20		

AMERICAN DUTIES

Are calculated as in the following Examples.

1. What is the duty on 2885 gallons of molasses, at 5 cts. per gallon?

2885
5

14425 cents. Ans. 144 dols. 25 cts.

2. What is the duty on the above molasses, if imported in a foreign vessel, the rate being 5½ cents per gallon, or 10 per cent. more than an American vessel?

2885
5½
14425
1442½
dols. 158,67½

Or, 144,25 as above
10 per cent. 14,42½
dols. 158,67½

3. How much is the duty on 3720 gallons of gin, at $31\frac{9}{10}$ cents per gallon?

	3720	3720
	$31\frac{9}{10}$	9
	3720	10)33480
	11160	
	3348	3348
dolls.	1186,68	

Ans. 1186 dolls. 68 cts.

		dols.	cts.
4.	1273 lb. chocolate at 3 cents ..... Ans.	38	19
5.	965 lb. do. in a foreign vessel at $3\frac{3}{10}$ do.	31	$84\frac{1}{2}$
6.	1149 lb. cheese at 7 ditto	80	43
7.	1295 lb. do. in a foreign vessel at $7\frac{7}{10}$ do.	99	$71\frac{1}{2}$
8.	1879 gals. Champaign wine at 45 do.	845	55
9.	2675 gals. London particular Madeira at 58 do.	1551	50

10. What is the duty on 53 cwt. 2 qrs. 21 lb. of untarred Cordage, at 225 cents per cwt.?

	225	
	53	
	675	
	1125	
2 qrs. $\frac{1}{2}$	$112\frac{1}{2}$	
14 lb. $\frac{1}{4}$	28	
7 do. $\frac{1}{8}$	14	
	120,79$\frac{1}{8}$	

Ans. 120 dols. 79$\frac{1}{2}$ cents.

11. What is the duty on the above cordage in a foreign vessel, at 247$\frac{1}{2}$ cts. per cwt.? Ans. 132 dols. 87$\frac{1}{2}$ cts.

12. How much is the duty on 4 hhds. of brown sugar, viz. gross 38 cwt. 1 qrs. 15 lb. tare 12 lb. per 100, at 2½ cents per lb.?

	3800	
	436 = excess 12 per cent.	
	84	
	16	
gross	4336	4339
tare	323	12
	3836	323,06
	2½	
	76,72	
	19192	
	95,90	Ans. 95 dols. 90 cents.

13. What is the duty on this sugar, in a foreign vessel, at 2½ cts. per lb.? Ans. 105 dols. 49 cts.

.....

The mode of estimating ad valorem rates of duty.

The ad valorem rates of duty upon goods, wares and merchandises, at the place of importation, shall be estimated by adding 20 per cent. to the actual cost thereof, if imported from the Cape of Good Hope, or from any other place beyond the same and ten per cent. on the actual cost thereof, if imported from any other place or country, including all charges, commissions, outside packages and insurance excepted—(See laws of the United States.)

EXAMPLES.

1. What is the duty on an invoice of silver and plated ware)

orted from London, the cost, exclusive of commissions, &c. g £.359 18 4, at 15 per cent. ad valorem?

		359
		444 cents per £. sterling
		1436
		1436
		1436
10s.	½	222
5	¼	111
3·4d.	⅓	74
actual cost		159803 cents
10 per cent. added		15980
		175783
10	1/10	17578
5	½	8789
for 15 per cent.		26367 cents.

Ans. 263 dols. 67 cents.

2. What will it amount to in a foreign vessel, at 16½ per t. ad valorem? Ans. 290 dols. 4 cents.

e rates at which all foreign coins and currencies are estimated at the Custom-Houses of the United States.

	Dols.	Cts.
ch pound sterling of Great Britain, at	4	44
ch pound sterling of Ireland	4	10
ch livre tournois of France		18½
ch florin or gilder of the United Netherlands		40
ch mark banco of Hamburgh		33⅓
ch rix dollar of Denmark	1	00
ch rial of plate of Spain		10
ch rial of vellon of Spain		5
ch milree of Portugal	1	24
ch tale of China	1	48
ch pagoda of India	1	85
ch rupee of Bengal		80

PROGRESSION

Consists of two parts—ARITHMETICAL and GEOMETRICAL.

ARITHMETICAL PROGRESSION

Is when a rank of numbers increase or decrease regularly, by the continual adding or subtracting of some equal number: As 1. 2. 3. 4. 5. 6, are in Arithmetical Progression by the continual increasing or adding of one, and 11, 9, 7, 5, 3, 1, by the continual decrease or subtraction of two.

NOTE. When any even number of terms differ by Arithmetical Progression, the sum of the two extremes will be equal to the two middle numbers, or any two means equally distant from the extremes: As 2, 4, 6, 8, 10, 12, where 6 + 8, the two middle numbers are = 12 + 2, the two extremes, and = 10 + 4 the two means = 14.

When the number of terms are odd, the double of the middle term will be equal to the two extremes, or of any two means equally distant from the middle term: As 1, 2, 3, 4, 5, where the double of 3 = 5 + 1 = 2 + 4 = 6.

In Arithmetical Progression five things are to be observed, viz.

1. The first term.
2. The last term.
3. The number of terms.
4. The equal difference.
5. The sum of all the terms.

Any three of which being given, the other two may be found.

The first, second and third term given to find the fifth.

RULE. Multiply the sum of the two extremes by half the number of terms, or multiply half the sum of the two extremes by the whole number of terms, the product is the total of all the terms.

EXAMPLES.

1. How many strokes does the hammer of a clock strike in 12 hours?

12 + 1 = 13 *then* 13 × 6 = 78 Ans.

2. A man buys 17 yards of cloth, and gave for the first yard 2s. and for the last 10s. what did the 17 yards amount to?

Ans. £5 2s.

3. If 100 eggs were placed in a right line, exactly a yard asunder from one another, and the first a yard from a basket, what length of ground does that man go who gathers up these 100 eggs singly, returning with every egg to the basket to put it in? Ans. 5 miles, 1300 yards.

The first, second and third terms given, to find the fourth.

RULE. From the second subtract the first, the remainder divided by the third less one gives the fourth.

EXAMPLES.

1. A man had 8 sons, the youngest was 4 years old, and the eldest 32, they increase in Arithmetical Progression, what was the common difference of their ages? Ans. 4.

32—4=28 then 28÷8—1=4 the common difference.

2. A man is to travel from Boston to a certain place in 12 days, and to go but 3 miles the first day, increasing every day by an equal excess, so that the last days journey may be 58 miles, what is the daily increase, and how many miles distant is that place from Boston? Ans. 5 miles daily increase.

Therefore as 3 miles is the first day's journey;

3+5= 8 second ditto.

8+5=13 third ditto, &c.

The whole distance is 366 miles.

The first, second and fourth terms given to find the third.

RULE. From the second subtract the first, the remainder divide by the fourth; and to the quotient add 1, gives the third.

EXAMPLES.

1. A person travelling into the country, went 3 miles the first day, and increased every day by 5 miles, till at last he went 58 miles in one day, how many days did he travel?

Ans. 12.

58—3=55 then 55÷5=11 and 11+1=12 the number of days.

2. A man being asked how many sons he had, said, that the youngest was 4 years old, and the eldest 32, and that he increased one in his family every 4 years, how many had he?

Ans. 8.

The second, third and fourth given to find the first.

RULE. Multiply the fourth by the third, made less by 1, the product subtracted from the second gives the first.

EXAMPLES.

1. A man in 10 days went from Boston to a certain town in the country, every day's journey increasing the former by 4, and the last day he went was 46 miles, what was the first?

Ans. 10 miles.

$4 \times 10 - 1 = 36$ then $46 - 36 = 10$, the first day's journey.

2. A man takes out of his pocket at 8 several times, so many different numbers of shillings, every one exceeding the former by 6; the last 46, what was the first? Ans. 4.

The second, third and fifth given to find the first.

RULE. Divide the fifth by the third, and from the quotient subtract half the product of the fourth, multiplied by the third less 1, gives the first.

EXAMPLE.

A man is to receive £.360 at 12 several payments, each to exceed the former by £.4, and is willing to bestow the first payment on any one that can tell him what it is, what will that person have for his pains? Ans. £.8.

$$360 \div 12 = 30 \text{ then } 30 - \frac{4 \times 12 - 1}{2} = 8. \text{ the first payment.}$$

The first, third and fourth given, to find the second.

RULE. Subtract the fourth from the product of the third, multiplied by the fourth, that remainder added to the first gives the second.

EXAMPLE.

What is the last number of an Arithmetical Progression, beginning at 6, and continuing by the increase of 8 to 20 places?
Ans. 158.

$20 \times 8 - 8 = 152$ then $152 + 6 = 158$, the last number.

.....

GEOMETRICAL PROGRESSION

Is the increasing or decreasing of any rank of numbers by some common ratio, that is, by the continual multiplication or division of some equal number: As 2, 4, 8, 16, increase by the multiplier 2, and 16, 8, 4, 2 decrease by the divisor 2.

NOTE. When any number of terms is continued in Geometrical Progression, the product of the two extremes will be equal to any two means, equally distant from the extremes: As 2, 4, 8, 16, 32, 64, where $64 \times 2 = 4 \times 32 = 8 \times 16 = 128$.

When the number of terms are odd, the middle term multiplied into itself will be equal to the two extremes, or any two means, equally distant from the mean: As 2, 4, 8, 16, 32, where $2 \times 32 = 4 \times 16 = 8 \times 8 = 64$.

In Geometrical Progression the same five things are to be observed, as in Arithmetical, viz.

1. The first term.
2. The last term.
3. The number of terms.
4. The equal difference or ratio.
5. The sum of all the terms.

NOTE. As the last term in a long series of numbers, is very tedious to come at, by continual multiplication; therefore, for the readier finding it out, there is a series of numbers made use of in Arithmetical Proportion, called Indices, beginning with an unit, whose common difference is one, whatever number of indices you make use of, set as many numbers (in such Geometrical Proportion as is given in the question) under them:

As 1, 2, 3, 4, 5, 6 indices.
2, 4, 8, 16, 32, 64 numbers in Geometrical Proportion.

But if the first term in Geometrical Proportion be different from the ratio, the indices must begin with a cypher.

As 0, 1, 2, 3, 4, 5, 6 indices,
1, 2, 4, 8, 16, 32, 64 numbers in Geometrical Proportion.

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Rule. Divide the fifth by the third, and from the quotient subtract half the product of the fourth, multiplied by the third less 1, gives the first.

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Ans. £.8.

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The first, third and fourth given, to find the second.

Rule. Subtract the fourth from the product of the third, *multiplied* by the fourth, that remainder added to the first, *gives the second.*

EXAMPLE.

What is the last number of an Arithmetical Progression, beginning at 6, and continuing by the increase of 8 to 20 places?
Ans. 158.

$20 \times 8 - 8 = 152$ then $152 + 6 = 158$, the last number.

.....

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NOTE. As the last term in a long series of numbers, is very tedious to come at, by continual multiplication; therefore, for the readier finding it out, there is a series of numbers made use of in Arithmetical Proportion, called indices, beginning with an unit, whose common difference is one, whatever number of indices you make use of, set as many numbers (in such Geometrical Proportion as is given in the question) under them:

As 1, 2, 3, 4, 5, 6 indices.
2, 4, 8, 16, 32, 64 numbers in Geometrical Proportion.

But if the first term in Geometrical Proportion be different from the ratio, the indices must begin with a cypher.

As 0, 1, 2, 3, 4, 5, 6 indices,
1, 2, 4, 8, 16, 32, 64 numbers in Geometrical Proportion.

When the indices begin with a cypher, the sum of the indices made choice of must be always one less than the number of terms given in the question, for 1 in the indices is over the second term, and 2 over the third, &c.

Add any two of the indices together, and that sum will agree with the product of their respective terms.

As in the first table of indices 2 + 5 = 7.
Geometrical Proportion ..... 4 × 32 = 128

Then in the second
2 + 4 = 6.
4 × 16 = 64.

In any Geometrical-Progression proceeding from unity, the ratio being known, to find any remote term, without producing all the intermediate terms.

RULE. Find what figures of the indices added together would give the exponent of the term wanted, then multiply the numbers standing under such exponent into each other, and it will give the term required.

NOTE. When the exponent 1 stands over the second term, the number of exponents must be 1 less than the number of terms.

EXAMPLES.

1. A man agrees for 12 peaches, to pay only the price of the last, reckoning a farthing for the first, a half-penny for the second, &c. doubling the price to the last, what must he give for them?

0, 1, 2, 3, 4, exponents.
1, 2, 4, 8, 16, number of terms.

1 + 4 + 3 = 11, number of terms less 1.

16 = 4.
16 = 4.
256 = 8
8 = 3
4)2048 = 11 numb. far.
12)512
20)42 8
£.2 2 8 answer.

2. A country gentleman going to a fair to buy some oxen, meets with a person who had 23, he demanding the price of them, was answered £.16 apiece; the gentleman bids him £.15

apiece, and he would buy all; the other tells him it would not be taken, but if he would give what the last ox would come to, at a farthing for the first, and doubling it to the last, he should have all. What was the price of the oxen?

Ans. £.4369 1s. 4d.

In any Geometrical Progression, not proceeding from unity, the ratio being given, to find any remote term, without producing all the intermediate terms.

RULE. Proceed as in the last, only observe that every product must be divided by the first term.

EXAMPLES.

1. A sum of money is to be divided among eight persons, the first to have £.20, the second £.60, and so on in triple proportion, what will the last have?

$$0.\ 1.\ 2.\ 3. \qquad \frac{540\times540}{20}=14580 \text{ then } \frac{14580\times60}{20}=43740.$$

20. 60. 180. 540.

Ans. £.43740.

3+3+1=7 one less than the number of terms.

2. A gentleman, dying, left 9 sons, to whom and to his executor, he bequeathed his estate in manner following: To his executor £.50; his youngest son was to have as much more as the executor, and each son to exceed the next younger by as much more; what was the eldest son's portion?

Ans. £.25600.

The first term, ratio, and number of terms given, to find the sum of all the terms.

RULE. Find the last term as before, then subtract the first from it, and divide the remainder by the ratio less one, to the product of which add the greater, and it gives the sum required.

EXAMPLES.

1. A servant skilled in numbers agreed with a gentleman to serve him 12 months, provided he would give him a farthing

for his first month's service, a penny for the second, and 4d for the third, &c.—what did his wages amount to?

$256 \times 256 = 65536$, then $65536 \times 64 = 4194304$

0. 1. 2. 3. 4.
1. 4. 16. 64. 256.
$(4+4+3=11$ No. of terms less 1.)

$$\frac{4194304-1}{4-1} = 1398101;$$ then

$1398101 + 4194304 = 5592405$ farthings.

Ans. £.5825 8s. 5¼d.

2. A man bought a horse, and by agreement was to give a farthing for the first nail, three for the second, &c.; there were 4 shoes, and in each shoe 8 nails; what was the worth of the horse? Ans. £.965114681693 13s. 4d.

3. A certain person married his daughter on new-year's day, and gave her husband one shilling towards her portion, promising to double it on the first day of every month for one year; what was her portion? Ans. £.204 15s.

4. A laceman well versed in numbers, agreed with a gentleman to sell him 22 yards of rich gold brocaded lace, for 2 pins the first yard, 6 pins the second, &c. in triple proportion. I desire to know what he sold the lace for, if the pins were valued at 100 for a farthing; also, what the laceman got or lost by the sale thereof, supposing the lace stood him in £.7 per yard. Ans. The lace sold for £.326886 0s. 9d.

Gain £.326732 0s. 9d.

.....

PERMUTATION

Is the changing or varying of the order of things.

Rule. Multiply all the given terms one into another, and the last product will be the number of changes required.

Examples.

1. How many changes may be rung upon 12 bells, and how long would they be ringing but once over, supposing 10 changes might be rung in one minute, and the year to contain 365 days 6 hours?

$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 \times 11 \times 12 = 479001600$ *changes*, which $\div 10 = 47900160$ minutes, and if reduced $= 91$ *years* 3 weeks 5 days and 6 hours.

2. A young scholar coming into a town for the conveniency of a good library, demands of a gentleman with whom he lodged, what his diet would cost for a year, who told him £.10; but the scholar not being certain what time he should stay, asked him what he must give him for so long as he could place his family (consisting of 6 persons besides himself) in different positions, every day at dinner; the gentleman, thinking it could not be long, tells him £.5, to which the scholar agrees; what time did the scholar stay with the gentleman?

Ans. 5040 days.

EXTRACTION OF THE SQUARE ROOT.

EXTRACTING THE SQUARE ROOT is to find out such a number as being multiplied into itself, the product will be equal to the given number.

RULE. 1. Point the given number, beginning at the unit's place, then to the hundred's, and so upon every second figure throughout.

2. Seek the greatest square number in the first point, towards the left hand, placing the square number under the first point, and the root thereof in the quotient; subtract the square number from the first point, and to the remainder bring down the next point, and call that the resolvend.

3. Double the quotient, and place it for a divisor on the left hand of the resolvend; seek how often the divisor is contained in the resolvend (reserving always the unit's place) and put the answer in the quotient, and also on the right hand side of the divisor; then multiply by the figure last put in the quotient, and subtract the product from the resolvend; bring down the next point to the remainder (if there be any more) and proceed as before.

ROOTS.	1.	2.	3.	4.	5.	6.	7.	8.	9.
SQUARES.	1.	4.	9.	16.	25.	36.	49.	64.	81.

EXAMPLES.

1. What is the square root of 119025?

```
                119025(345
                  9
                ------
64)290
   256
                ------
685)3425
    3425                    Ans. 345.
                ------
```

2. What is the square root of 106929? Ans. 327
3. What is the square root of 2268741? Ans. 1506,23+
4. What is the square root of 7596796? Ans. 2756,228+
5. What is the square root of 36372961? Ans. 6031
6. What is the square root of 22071204? Ans. 4698

When the given number consists of a whole number and decimals together, make the number of decimals even, by adding cyphers to them, so that there may be a point fall on the unit's place of the whole number.

7. What is the square root of 3271,4007? Ans. 57,19+
8. What is the square root of 4795,25731? Ans. 69,247+
9. What is the square root of 4,372594? Ans. 2,091+
10. What is the square root of 2,2710957? Ans. 1,50701+
11. What is the square root of ,00032754? Ans. ,01809+
12. What is the square root of 1,270054? Ans. 1,1269+

To extract the square root of a vulgar fraction.

RULE. Reduce the fraction to its lowest terms, then extract the square root of the numerator for a new numerator, and the square root of the denominator for a new denominator.

If the fraction be a surd, (i. e.) a number whose root can never be exactly found, reduce it to a decimal, and extract the root from it.

EXAMPLES.

13. What is the square root of $\frac{2304}{5184}$? Ans. $\frac{8}{9}$.
14. What is the square root of $\frac{4761}{1089}$? Ans. $\frac{3}{3}$.
15. What is the square root of $\frac{2256}{10609}$? Ans. $\frac{9}{}$.

SURDS.

16. What is the square root of $\frac{215}{341}$? Ans. ,89802+
17. What is the square root of $\frac{357}{476}$? Ans. ,86602+
18. What is the square root of $\frac{478}{544}$? Ans. ,93308+

To extract the square root of a mixed number.

RULE. 1. Reduce the fractional part of the mixed number to its lowest term, and then the mixed number to an improper fraction.

2. Extract the roots of the numerator and denominator for a new numerator and denominator.

If the mixed number given be a surd, reduce the fractional part to a decimal, annex it to the whole number, and extract the square root therefrom.

EXAMPLES.

19. What is the square root of $51\frac{24}{25}$? Ans. $7\frac{1}{5}$.
20. What is the square root of $27\frac{6}{16}$? Ans. $5\frac{1}{4}$.
21. What is the square root of $9\frac{40}{49}$? Ans. $3\frac{1}{7}$.

SURDS.

22. What is the square root of $85\frac{1}{3}$? Ans. 9,27+
23. What is the square root of $8\frac{6}{7}$? Ans. 2,9519+
24. What is the square root of $6\frac{2}{3}$? Ans. 2,5298+

THE APPLICATION.

1. There is an army consisting of a certain number of men, who are placed rank and file, that is, in the form of a square, each side having 576 men, I desire to know how many the whole square contains? Ans. 331776.

2. A certain pavement is made exactly square, each side of which contains 97 feet, I demand how many square feet are contained therein? Ans. 9409.

To find a mean proportional between any two given numbers.

RULE. The square root of the product of the given numbers is the mean proportional sought.

EXAMPLES.

1. What is the mean proportional between 3 and 12 ?
Ans. $3 \times 12 = 36$ then $\sqrt{36} = 6$ the mean proportional.

2. What is the mean proportional between 4276 and 842?
Ans. 1897,4+

To find the side of a square equal in area to any given superfices.

RULE. The square root of the content of any given superficies, is the square equal sought.

EXAMPLES.

3. If the content of a given circle be 160, what is the side of the square equal ? Ans. 12,64911.

4. If the area of a circle is 750, what is the side of the square equal ? Ans. 27,38612.

The area of a circle given to find the diameter.

RULE. As 355 : 452, or as 1 : 1,273239 : : so is the area : to the square of the diameter;—or, multiply the square root of the area by 1,12837, and the product will be the diameter.

EXAMPLE.

5. What length of cord will fit to tie to a cow's tail, the other end fixed in the ground, to let her have liberty of eating an acre of grass, and no more, supposing the cow and tail to be 5 yards and a half? Ans. 6,136 perches.

The area of a circle given to find the periphery, or circumference.

RULE. As 113 1420, or as 1 : 12,56637 : : the area : to the square of the periphery, or multiply the square root of the area by 3,5449, and the product is the circumference.

EXAMPLES.

6. When the area is 12, what is the circumference ?
Ans. 12,2798.

7. When the area is 160, what is the periphery ?
Ans. 44,84.

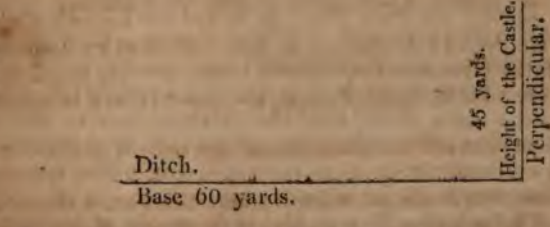
Any two sides of a right angled triangle given to find the third side.

1. The base and perpendicular given to find the hypothenuse.

RULE. The square root of the sum of the squares of the base and perpendicular is the length of the hypothenuse.

EXAMPLES.

8. The top of a castle from the ground is 45 yards high, and is surrounded with a ditch 60 yards broad ; what length must a ladder be to reach from the outside of the ditch to the top of the castle ? Ans. 75 yards.



9. The wall of a town is 25 feet high, which is surrounded by a moat of 30 feet in breadth, I desire to know the length of a ladder that will reach from the outside of the moat to the top of the wall. Ans. 39,05 feet.

The hypothenuse and perpendicular given to find the base.

RULE. The square root of the difference of the squares of the hypothenuse and perpendicular is the length of the base

The base and hypothenuse given to find the perpendicular.

RULE. The square root of the difference of the hypothenuse and base is the heighth of the perpendicular.

N. B. The two last questions may be varied for example to the two last propositions.

Any number of men being given to form them into a square battle, or to find the number of ranks and files.

RULE. The square root of the number of men given, is the number of men either in rank or file.

10. An army consisting of 331776 men, I desire to know how many in rank and file? Ans. 576.

11. A certain square pavement contains 48841 square stones, all of the same size, I demand how many are contained in one of the sides. Ans. 221.

EXTRACTION OF THE CUBE ROOT.

To extract the Cube Root is to find out a number which being multiplied into itself, and then into that product, produceth the given number.

RULE. Point every third figure of the cube given, beginning at the unit's place, seek the greatest cube to the first point and subtract it therefrom, put the root in the quotient, and bring down the figures in the next point to the remainder for a resolvend.

2. Find a divisor by multiplying the square of the quotient by 3. See how often it is contained in the resolvend, rejecting the units and tens, and put the answer in the quotient.

3. To find the *subtrahend*. 1. Cube the last figure in the quotient. 2. Multiply all the figures in the quotient by 3, except the last, and that product by the square of the last. 3. Multiply the divisor by the last figure. Add these products together, gives the subtrahend, which subtract from the resolvend; to the remainder bring down the next point and proceed *as before*.

Roots.	1.	2.	3.	4.	5.	6.	7.	8.	9.
Cubes.	1.	8.	27.	64.	125.	216.	343.	512.	729.

EXAMPLE.

What is the cube root of 99252847 ?

99252847(463
64=Cube of 4.
Divisor.———
Square of 4×3=48)35252 Resolvend

216=Cube of 6
432 =4×3× by square of 6
288 =Divisor × by 6

33336 Subtrahend
Divisor.———
Sq. of 46×3=6348)1916847 Resolvend

27=Cube of 3
1242 =46×3× by square of 3
19044 =Divisor × by 3

1916847 Subtrahend.

Another new and more concise method of extracting the Cube Root.

RULE. 1. Point every third figure of the cube given, beginning at the unit's place, then find the nearest cube to the first point, and subtract it therefrom, put the root in the quotient, bring down the figures in the next point to the remainder for a resolvend.

2. Square the quotient and triple the square for a divisor—as, 4×4×3=48. Find how often it is contained in the resolvend, rejecting units and tens, and put the answer in the quotient.

3. Square the last figure in the quotient, and put it on the right hand of the divisor:

As 6×6=36 put to the divisor 48=4836.

4. Triple the last figure in the quotient, and multiply by the former, put it under the other, units under the tens, add them together, and multiply the sum by the last figure in

quotient, subtract that product from the resolvend, bring down the next point and proceed as before.

EXAMPLES.

1. What is the cube root of 99252847 ?

Square of $4\times3=48$ divisor
Square of 6 put to $48=4836$
$6\times3\times4=72$

$5556\times6=33336$

Square of $46=2116\times3=6348$ divisor
Square of $3=9$ put to $6348=*634809$
$3\times3\times46=414$

$638949\times3=1916847$

99252847(463
64
35252
33336
1916847

2.	What is the cube root of 389017 ?	Ans. 73.
3.	What is the cube root of 5735339 ?	Ans. 179.
4.	What is the cube root of 32461759 ?	Ans. 319.
5.	What is the cube root of 84604519 ?	Ans. 439.
6.	What is the cube root of 259694072 ?	Ans. 638.
7.	What is the cube root of 48228544 ?	Ans. 364.
8.	What is the cube root of 27054036008 ?	Ans. 3002.
9.	What is the cube root of 22069810125 ?	Ans. 2805.
10.	What is the cube root of 122615327232 ?	Ans. 4968.
11.	What is the cube root of 219365327791 ?	Ans. 6031.
12.	What is the cube root of 673373097125 ?	Ans. 8765.

When the given number consists of a whole number and decimal together, make the number of decimals to consist of 3, 6, 9, &c. places, by adding cyphers thereto, so that there may be a point fall on the unit's place of the whole number.

13.	What is the cube root of 12,977875 ?	Ans. 2,35
14.	What is the cube root of 36155,027576 ?	Ans. 33,06+
15.	What is the cube root of ,001906624 ?	Ans. ,124
16.	What is the cube root of 33,230979637 ?	Ans. 3,215+
17.	What is the cube root of 15926,972504 ?	Ans. 25,16+
18.	What is the cube root of ,053258279 ?	Ans. ,376+

* When the quotient is 1, 2 or 3, there must be a cypher put to supply the place of tens.

To extract the cube root of a vulgar fraction.

RULE. Reduce the fraction to its lowest terms, then extract the cube root of the numerator and denominator for a new numerator and denominator; but if the fraction be a surd, reduce it to a decimal, and then extract the root from it.

EXAMPLES.

19. What is the cube root of $\frac{250}{686}$? Ans. $\frac{5}{7}$.
20. What is the cube root of $\frac{324}{1500}$? Ans. $\frac{3}{5}$.
21. What is the cube root of $\frac{1520}{5130}$? Ans. $\frac{2}{3}$.

SURDS.

22. What is the cube root of $\frac{4}{7}$? Ans. ,829+
23. What is the cube root of $\frac{5}{9}$? Ans. ,822+
24. What is the cube root of $\frac{2}{3}$? Ans. ,873+

To extract the Cube Root of a mixt number.

RULE. Reduce the fractional part to its lowest terms, and then the mixt number to an improper fraction, extract the cube roots of the numerator and denominator for a new numerator and denominator; but if the mixt number given be a surd, reduce the fractional part to a decimal, annex it to the whole number, and extract the root therefrom.

EXAMPLES.

25. What is the cube root of $12\frac{19}{27}$? Ans. $2\frac{1}{3}$.
26. What is the cube root of $31\frac{15}{343}$? Ans. $3\frac{1}{7}$.
27. What is the cube root of $405\frac{28}{125}$? Ans. $7\frac{2}{5}$.

SURDS.

28. What is the cube root of $7\frac{1}{5}$? Ans. 1,934+
29. What is the cube root of $9\frac{1}{6}$? Ans. 2,092+
30. What is the cube root of $8\frac{3}{7}$? Ans. 2,057+

THE APPLICATION.

1. If a cubical piece of timber be 47 inches long, 47 inches broad, and 47 inches deep, how many cubical inches doth it contain? Ans. 103823.

2. There is a cellar dug that is 12 feet every way, in length, breadth and depth, how many solid feet of earth were taken out of it? Ans. 1728.

3. There is a stone of a cubic form, which contains 389017 solid feet, what is the superficial content of one of its sides? Ans. 5329.

Between two numbers given, to find two mean proportionals.

RULE. Divide the greater extreme by the lesser, and the cube root of the quotient multiplied by the lesser extreme, gives the lesser mean; multiply the said cube root by the lesser mean, and the product will be the greater mean proportional.

EXAMPLES.

4. What are the two mean proportionals between 6 and 162? Ans. 18 and 54.

5. What are the two mean proportionals between 4 and 108? Ans. 12 and 36.

To find the side of a cube that shall be equal in solidity to any given solid, as a globe, cylinder, prism, cone, &c.

RULE. The cube root of the solid content of any solid body given is the side of the cube of equal solidity.

EXAMPLE.

6. If the solid content of a globe is 10648, what is the side of a cube of equal solidity? Ans. 22.

The side of the cube being given, to find the side of that cube, that shall be double, treble, &c. in quantity to the given cube.

RULE. Cube the side given, and multiply it by 2, 3, &c. the cube root of the product is the side sought.

EXAMPLE.

7. There is a cubical vessel, whose side is 12 inches, and it is required to find the side of another vessel that is to contain 3 times as much? Ans. 17,306.

EXTRACTION OF THE BIQUADRATE ROOT.

To extract the Biquadrate Root is to find out a number, which being involved four times into itself, will produce the given number.

RULE. First extract the square root of the given number, and then extract the square root of that square root, and it will give the biquadrate root required.

EXAMPLES.

1. What is the biquadrate of 27 ?	Ans. 531441.
2. What is the biquadrate of 76 ?	33362176.
3. What is the biquadrate of 275 ?	5719140625.
4. What is the biquadrate root of 531441 ?	27.
5. What is the biquadrate root of 33362176 ?	76.
6. What is the biquadrate root of 5719140625 ?	275.

A GENERAL RULE

FOR EXTRACTING THE ROOTS OF ALL POWERS.

1. PREPARE the number given for extraction, by pointing off from the unit's place, as the root required directs.

2. Find the first figure in the root, by the table of powers, which subtract from the given number.

3. Bring down the first figure in the next point to the remainder, and call it the dividend.

4. Involve the root into the next inferior power to that which is given; multiply it by the given power, and call it the divisor.

5. Find a quotient figure by common division, and annex it to the root; then involve the whole root into the given power, and call that the subtrahend.

6. Subtract that number from as many points of the given power as is brought down, beginning at the lowest place, and to the remainder bring down the first figure of the next point for a new dividend.

7. Find a new divisor, and proceed in all respects as before.

EXAMPLES.

1. What is the square root of 141376 ?

141376(376
9

6)51 dividend
1369 subtrahend

74) 447 dividend
141376 subtrahend

$3 \times 2 = 6$ divisor
$37 \times 37 = 1369$ subtrahend
$37 \times 2 = 74$ divisor
$376 \times 376 = 141376$ subtrahend.

Ans. 376.

2. What is the cube root of 53157376 ?

53157376(376
27

27) 261 dividend
50653 subtrahend
4107)25043 dividend
53157376 subtrahend

$3 \times 3 \times 3 = 27$ divisor
$37 \times 37 \times 37 = 50653$ subtrahend
$37 \times 37 \times 3 = 4107$ divisor
$376 \times 376 \times 376 = 53157376$ subtrahend.

Ans. 376.

3. What is the biquadrate root of 19987173376 ?

19987173376(376
81

108)1188 dividend
1874161 subtrahend
202612) 1245563 dividend
19987173376 subtrahend

$3 \times 3 \times 3 \times 4 = 108$ divisor
$37 \times 37 \times 37 \times 37 = 1874161$ subtrahend
$37 \times 37 \times 37 \times 4 = 202612$ divisor
$376 \times 376 \times 376 \times 376 = 19987173$ [illegible]hend. Ans. 376.

DUODECIMALS.

DUODECIMALS, or Cross Multiplication, is a rule made use of in measuring and computing the dimensions of the several parts of buildings; it is likewise used to find ships' tonnage and the contents of bales, cases, &c.

Dimensions are taken in feet, inches, and parts.

Artificers' work is computed by different measures, viz.
Glazing, and masons' flat work, by the foot;
Painting, paving, plastering, &c. by the yard.
Partitioning, flooring, roofing, tiling, &c. by the square of 100 feet.
Brick-work, &c. by the rod of $16\frac{1}{2}$ feet, whose square is $272\frac{1}{4}$.

The contents of bales, cases, &c. by the ton of 40 cubic feet.
The tonnage of ships, by the ton of 95 feet.

* * * * * *

RULE FOR MULTIPLYING DUODECIMALLY.

1. Under the multiplicand write the corresponding denominations of the multiplier.

2. Multiply each term in the multiplicand, (beginning at the lowest) by the feet in the multiplier; write each result under each respective term, observing to carry an unit from each lower denomination to its superior.

3. In the same manner, multiply the multiplicand by the inches in the multiplier, and write the result of each term, one place more to the right hand of them, in the multiplicand.

4. Work in the same manner with the other parts in the multiplier, setting the result of each term two places to the right hand of those in the multiplicand, and so on for thirds, fourths, &c.

5. Proceed in the like manner with all the rest of the denominations, and their sum will give the answer required.

EXAMPLES.

1. Multiply 4 feet 9 inches by 8 inches.

4	9	
	8	
3.	2	Ans. 3 feet 2 inches.

2. Multiply 9 feet 6 inches by 4 feet 9 inches.

	f.	inc.	
	9	6	
	4	9	
f. inc.			
9 6 × 4 feet =	38	0	
9 6 × 9 in. =	7	1	6
	45	1	6

Ans. 45 feet 1 inch and 6 twelfths.

3. What is the price of a marble slab, whose length is 5 feet 7 inches, and breadth 1 foot 10 inches, at 1 dollar per foot?

Ans. 10 dols. 23 cents.

4. There is a house with three tiers of windows, 3 in a tier, the height of the first tier is 7 feet 10 inches, of the second 6 feet 8 inches, and of the third 5 feet 4 inches, and the breadth of each is 3 feet 11 inches; What will the glazing come to, at 14*d.* per foot?

Ans. £. 13 11*s.* 10½*d.*

5. If a house measures within the walls 52 feet 8 inches in length, and 30 feet 6 inches in breadth, and the roof be of a true pitch or the rafters ¾ of the breadth of the building, what will it come to roofing at 10*s.* 6*d.* per square?

Ans. £.12 12*s.* 11¾*d.*

APPLICATION OF DUODECIMALS.

To find how many cubic or solid square feet (in order to ascertain the freight) are contained in cases, bales, &c. that is, how many cubic feet they will take up in a ship.

EXAMPLES.

1. Suppose the dimensions of a bale to be 7 feet 6 inches, 3.

feet 3 inches, and one foot 10 inches; what is the solid content?

		f.	inc.	
		7	6	
		3	3	
f.	inc.			
7	6 × 3 ft. =	22	6	
7	6 × 3 in. =	1	10	6
		24	4	6
		1	10	
f.	inc. two.			
24	4 6 × 1 ft. =	24	4	6
24	4 6 × 10 in. =	20	3	9
		44	8	3

Ans. 44 feet 8 inches and 3 twelfth parts.

2. What is the freight of a bale containing 65 feet 9 inches, at 15 dollars per ton of 40 feet?

		dols. cts.	decimally.
		15,00 for 40 feet	65,75
20 ft.	$\frac{1}{2}$	7,50	15
5 ft.	$\frac{1}{4}$	,87,5	
6 in.	$\frac{1}{10}$	,18,7	32875
3	$\frac{1}{2}$	,09,3	6575
		24,65,5	40)986,25
			24,65,6

Ans. 24 dollars 65½ cents.

3. A merchant imports from London 6 bales of the following dimensions, viz.

	Length.		Height.		Depth.	
	f.	in.	f.	in.	f.	in.
No. 1.	2	10	2	4	1	9
2.	2	10	2	6	1	3
3.	3	6	2	2	1	8
4.	2	10	2	8	1	9
5.	2	10	2	6	1	9
6	2	11	2	8	1	7

What are the solid contents, and how much will the freight amount to, at 20 dollars per ton?

The contents are, viz.	*f.*	*in.*
No. 1.	11	7
2.	8	10
3.	12	7
4.	13	2
5.	12	5
6.	13	0
Feet.		
71,58	71	7

20 dols. per ton.

40)1431,60

35,79 Ans. 35 dols. 79 cents.

.....

To find Ships' Tonnage by Carpenters' Measure.

RULE. For single decked vessels, multiply the length, breadth at the main beam, and depth of the hold together, and divide the product by 95.

EXAMPLE.

What is the tonnage of a single decked vessel, whose length is 60 feet, breadth 20 feet, and depth 8 feet?

60 length
20 breadth

1200
8

95)9600(101 $\frac{5}{95}$
95

100
95

5

Ans. 101 $\frac{5}{95}$ tons.

This is the usual method of tonnaging a single-decked vessel, having the deck bolted to the wale. But if it be required that the deck be bolted at any height above the wale, the custom is to pay the carpenter for one half of the additional height, to which the deck may be above raised; that is, one half of the difference being added to the for[illegible] the depth to be used in calculating the tonnage.

EXAMPLE.

A merchant, after having contracted with a carpenter to build a single-decked vessel of 60 feet keel, 20 feet beam, and 8 feet hold, desires that the deck be laid for 10 feet hold; required the tonnage to be paid for?

60 length.
20 breadth.

1200

1 = ½ the diff. of depth + 8 = 9

95)10800(113$\frac{65}{95}$
95

130
95

350
285

65

Ans. 113$\frac{65}{95}$ tons.

RULE. For a double-decked vessel, take half the breadth of the main beam for the depth of the hold, and work as for a single-decked vessel.

EXAMPLES.

1. What is the tonnage of a double-decked vessel, whose length is 65 feet, and breadth 21 feet 6 inches.

65 length.
21 6 breadth.

65
130
65 ft. × 6 in. = 32 6

1397 6
10 9 depth.

f. in.
1397 6 × 10 ft. = 13975 0
1397 6 × 9 in. = 1048 1

15023 1

95)15023 1(158$\frac{13}{95}$
95

552
475

773
760

13

Ans. 158$\frac{13}{95}$ tons.

X

The preceding question may be wrought thus:

65
21 6
65
130
6 ½ 1365
32 6
1397 6
10 9
13975 0
6 ½ 698 9
3 ¼ 349 4
95)15023 1 as before.
158 13/95 tons.

2. What will the above tonnage amount to, at 16 dolls per ton?

158
16
948
158
2,18
2530,18

Ans. 2530 dols. 18 cents.

dols.
16
13
48
16
95)208(2,18
190
180
95
850
760
90

3. Required the tonnage of a ship of 74 feet keel, and 2 feet 6 inches beam? Ans. 273 48/95 tons.

To find the Government Tonnage.

"If the vessel be double-decked, take the length thereof from the fore part of the main stem, to the after part of the sternpost, above the upper deck; the breadth thereof at the broadest part above the main wales, half of which breadth shall be accounted the depth of such vessel, and then deduct from the length, three-fifths of the breadth, multiply the remainder by the breadth, and the product by the depth, and divide this last product by 95, the quotient whereof shall be deemed the true contents or tonnage of such ship or vessel; and if such ship or vessel be single-decked, take the length and breadth, as above directed, deduct from the said length three-fifths of the breadth, and take the depth from the under side of the deck plank, to the ceiling in the hold, then multiply and divide as aforesaid, and the quotient shall be deemed the tonnage."

EXAMPLES.

1. What is the government tonnage of a single-decked vessel, whose length is 69 feet 6 inches, breadth 22 feet 6 inches, and depth 8 feet 6 inches?

	feet.in.		
	69 6	length	22 6 breadth.
deduct	13 6	for $\frac{3}{5}$ breadth	3
	56 0		5)67 6
	22 6	breadth	13 6
	112 0		
	112		
6 in. $\frac{1}{2}$	28 0		
	1260 0		
	8 6	depth	
	10080 0		
6 in. $\frac{1}{2}$	630 0		
95)10710 0(112$\frac{70}{95}$ tons.			
	95		
	121		
	95		
	261		
	190		
	70		Ans. 112$\frac{70}{95}$ tons.

2. What is the government tonnage of a double-decked vessel, of the following dimensions, length 75 feet 6 inches, breadth 23 feet 4 inches, and depth 11 feet 8 inches?

	feet.in.			*feet in.*
	75 6		Or,	75 6
	14 0	for $\frac{2}{3}$ breadth		14 0
	61 6			61 6
	23 4	breadth		23 4
	183		61 f. × 23 f. =	1403 0
	122		6 in. × 23 f. =	11 6
6 in. $\frac{1}{2}$	11 6		61 f. 6 in. × 4 in. =	20 6
4 in. $\frac{1}{3}$	20 6			1435 0
	1435 0			11 8
	11 8	depth.		15785
	15785 0		1435 f. × 8 in. =	956 8
6 in. $\frac{1}{2}$	717 6			16741 8 as before.
2 in. $\frac{1}{3}$	239 2			

95)16741 8(176$\frac{21}{95}$ tons.
95

724
665

591
570

21

Ans. 176$\frac{21}{95}$ tons.

3. What is the government tonnage of a double-decked vessel, of the following dimensions, length 82 feet 3 inches, breadth 24 feet 3 inches, and depth 12 feet 1$\frac{1}{2}$ inches?

Ans. 209$\frac{33}{95}$ tons.

TABLES OF *CORDAGE.*

A CORDAGE TABLE, *shewing how many fathoms, feet, and inches of a rope, of any size, not more than* 14 *inches, make a hundred weight; with the use of the table.*

Inches.	*Fathoms. Feet. Inches.*	*Inches.*	*Fathoms. Feet. Inches.*	*Inches.*	*Fathoms. Feet. Inches.*	*Inches.*	*Fathoms. Feet. Inches.*
1	480 0 0	4 1/4	26 5 5	7 1/4	8 4 0	10 3/4	4 1 8
1 1/4	313 3 0	4 1/2	24 0 0	7 1/2	8 3 6	11	4 0 3
1 1/2	216 3 0	4 3/4	21 3 0	8	7 3 6	11 1/4	3 5 7
1 3/4	159 3 0	5	19 3 0	8 1/4	7 0 8	11 1/2	3 4 1
2	124 3 0	5 1/4	17 4 0	8 1/2	6 4 3	11 3/4	3 3 3
2 1/4	96 2 0	5 1/2	16 1 0	8 3/4	6 2 1	12	3 2 3
2 1/2	77 3 0	5 3/4	14 4 6	9	6 0 0	12 1/4	3 2 1
2 3/4	65 4 0	6	13 3 0	9 1/4	5 4 0	12 1/2	3 2 0
3	54 0 0	6 1/4	12 2 0	9 1/2	5 2 0	12 3/4	2 7 8
3 1/4	45 5 2	6 1/2	11 3 0	9 3/4	5 0 6	13	2 5 3
3 1/2	39 3 0	6 3/4	10 4 0	10	4 5 0	13 1/4	2 4 9
3 3/4	34 3 9	7	9 5 6	10 1/4	4 4 1	13 1/2	2 4 0
4	30 1 6	7 1/4	9 1 6	10 1/2	4 2 2	13 3/4	2 3 6
						14	2 2 1

USE OF THE TABLE.

At the top of the table, marked inches, fathoms, feet, inches, the first column is the thickness of the rope in inches and quarters, and the other three the fathoms, feet, and inches that make up a hundred weight of such a rope. One example will make it plain:

Suppose you desire to know how much of a seven-inch rope will make a hundred weight: Find 7 in the third column under inches, or thickness of rope, and against it in the fourth column you find 9 5 6, which shews that there will be 9 fathoms 5 feet 6 inches required to make one hundred weight.

A TABLE

receiving and paying the Gold Coins of FRANCE *and* SPAIN, *at* 100 *cents for* 27 $\frac{4}{5}$ *grains, according to Act of Congress.*

		137ths				137ths				137ths
ins.	dol.	cts.	of a ct.	dwt.	dol.	cts.	of a ct.	ounces.	dol.	cts. of a ct.
—	0	3	89	12 —	10	51	13	27 —	472	99 37
—	0	7	41	13 —	11	38	94	28 —	490	51 13
—	0	10	130	14 —	12	26	38	29 —	508	2 126
—	0	14	82	15 —	13	13	119	30 —	525	54 102
—	0	18	34	16 —	14	1	63	31 —	543	6 78
—	0	21	123	17 —	14	89	7	32 —	560	58 54
—	0	25	75	18 —	15	76	88	33 —	578	10 30
—	0	29	27	19 —	16	60	32	34 —	595	62 6
—	0	32	116	20 —	17	51	113	35 —	613	13 119
—	0	36	68	ounces.				36 —	630	65 95
—	0	40	20	1 —	17	51	113	37 —	648	17 71
—	0	43	109	2 —	35	3	89	38 —	665	69 47
—	0	47	61	3 —	52	55	65	39 —	683	21 23
—	0	51	13	4 —	70	7	41	40 —	700	72 136
—	0	54	102	5 —	87	59	17	41 —	718	24 112
—	0	58	54	6 —	105	10	130	42 —	735	76 88
—	0	62	6	7 —	122	62	106	43 —	753	28 64
—	0	65	95	8 —	140	14	82	44 —	770	80 40
—	0	69	47	9 —	157	66	58	45 —	788	32 16
—	0	72	130	10 —	175	18	34	46 —	805	83 129
—	0	76	88	11 —	192	70	10	47 —	823	35 105
—	0	80	40	12 —	210	21	125	48 —	840	87 81
—	0	83	129	13 —	227	73	99	49 —	858	39 57
—	0	87	81	14 —	245	25	75	50 —	875	91 33
dwt.				15 —	262	77	51	51 —	893	43 9
—	0	87	81	16 —	280	29	27	52 —	910	94 122
—	1	75	25	17 —	297	81	3	53 —	928	46 98
—	2	62	106	18 —	315	32	116	54 —	945	98 74
—	3	50	50	19 —	332	84	92	55 —	963	50 50
—	4	37	131	20 —	350	36	68	56 —	981	2 26
—	5	25	75	21 —	367	88	44	57 —	998	54 2
—	6	13	19	22 —	385	40	20	58 —	1016	5 115
—	7	0	100	23 —	402	91	131	59 —	1033	57 91
—	7	88	44	24 —	420	43	109	60 —	1051	9 67
—	8	75	125	25 —	437	95	85	61 —	1068	61 43
—	9	63	69	26 —	455	47	61	62 —	1086	

A TABLE

For receiving and paying the Gold Coins of GREAT-BRITAIN *and* PORTUGAL, *at* 100 *cents for* 27 *grains, according to Act of Congress.*

grs.		27ths dol. cts. of a ct.			dwt.		9ths dol. cts. of a ct.			oz.		9ths dol. cts. of a ct.		
1	—	0	3	19	12	—	10	66	6	28	—	497	77	7
2	—	0	7	11	13	—	11	55	5	29	—	515	55	5
3	—	0	11	3	14	—	12	44	4	30	—	533	33	3
4	—	0	14	22	15	—	13	33	3	31	—	551	11	1
5	—	0	18	14	16	—	14	22	2	32	—	568	88	8
6	—	0	22	6	17	—	15	11	1	33	—	586	66	6
7	—	0	25	25	18	—	16	00	0	34	—	604	44	4
8	—	0	29	17	19	—	16	88	8	35	—	622	22	2
9	—	0	33	9	20	—	17	77	7	36	—	640	00	0
10	—	0	37	1	ounces.					37	—	657	77	7
11	—	0	40	20	1	—	17	77	7	38	—	675	55	5
12	—	0	44	12	2	—	35	55	5	39	—	693	33	3
13	—	0	48	4	3	—	53	33	3	40	—	711	11	1
14	—	0	51	23	4	—	71	11	1	41	—	728	88	8
15	—	0	55	15	5	—	88	88	8	42	—	746	66	6
16	—	0	59	7	6	—	106	66	6	43	—	764	44	4
17	—	0	62	26	7	—	124	44	4	44	—	782	22	2
18	—	0	66	18	8	—	142	22	2	45	—	800	00	0
19	—	0	70	10	9	—	160	00	0	46	—	817	77	7
20	—	0	74	2	10	—	177	77	7	47	—	835	55	5
21	—	0	77	21	11	—	195	55	5	48	—	853	33	3
22	—	0	81	13	12	—	213	33	3	49	—	871	11	1
23	—	0	85	5	13	—	231	11	1	50	—	888	88	8
24	—	0	88	24	14	—	248	88	8	51	—	906	66	6
				9ths	15	—	266	66	6	52	—	924	44	4
dwt.		dol. cts. of a ct.			16	—	284	44	4	53	—	942	22	2
1	—	0	88	8	17	—	302	22	2	54	—	960	00	0
2	—	1	77	7	18	—	320	00	0	55	—	977	77	7
3	—	2	66	6	19	—	337	77	7	56	—	995	55	5
4	—	3	55	5	20	—	355	55	5	57	—	1013	33	3
5	—	4	44	4	21	—	373	33	3	58	—	1031	11	1
6	—	5	33	3	22	—	391	11	1	59	—	1048	88	8
7	—	6	22	2	23	—	408	88	8	60	—	1066	66	6
8	—	7	11	1	24	—	426	66	6	61	—	1084	44	4
9	—	8	00	0	25	—	444	44	4	62	—	1102	22	2
10	—	8	88	8	26	—	462	22	2	63	—	1120	00	0
11	—	9	77	7	27	—	480	00	0	64	—	1137	77	7

MERCANTILE PRECEDENTS.

BILL OF EXCHANGE.

Newburyport, Feb. 12, 1803.

EXCHANGE for £.1000 sterling.

At twenty days sight of this my first of exchange (second and third of the same tenor and date not paid) pay to John Parker, or order, One Thousand Pounds Sterling, with or without further advice from

Your humble servant,
WILLIAM PRINCE.

Messrs. DUTTON & GREEN,
Merchants,
London.

.....

BILL OF GOODS, at an advance on the sterling cost.

Boston, May 5, 1803.

Mr. WILLIAM POOLE

Bought of SIMON SIMMONDS,

32 ells mode	1*s.* 8*d.* sterl.	£. 2	13 4
64 yds. striped Nankins	1*s.* 6*d.*	4	16 0
28 .. striped calico	1*s.* 9*d.*	2	9 0
4 pieces russel	24*s.*	4	16 0
	Sterl.	14	14 4
	Exchange 33⅓ per cent.	4	18 1¼
	£.	19	12 5¼
	Advance at 20 per cent.	3	18 5¾
	£.	23	10 11

Dollars 78,48

Received his note at 2 months,
SIMON SIMM[illegible]

PROMISSORY NOTE.

Boston, May 5, 1803. For value received, I promise to pay to Simon Simmonds, or order, Seventy-eight dollars forty-eight cents, on demand, with interest after two months.

Attest, WILLIAM POOLE.
SAUL JAMES.

.....

A RECEIPT FOR AN ENDORSEMENT ON A NOTE.

Boston, July 12, 1803. Received from Mr. William Poole, (by the hands of Mr. Benjamin Flint) Thirty-eight dollars seventy cents, which is endorsed on his note of May 5, 1803.

SIMON SIMMONDS.

38 dols. 70 cts.

.....

RECEIPT FOR MONEY RECEIVED ON ACCOUNT.

Boston, January 10, 1083. Received from Mr. D. Evans, (by the hands of Mr. Thomas Dunmore,) Four hundred and thirty dollars on account.

430 dols. GEORGE PACE.

.....

PROMISSORY NOTE BY TWO PERSONS.

Newburyport, 12th. July, 1803. For value received we jointly and severally promise to pay to Mr. Samuel Rich, or order, Five hundred dollars fifty four cents, on demand, with interest.

Attest, NATHAN SAYBORN.
WILLIAM BOLTON. STEPHEN NEEDY.

.....

GENERAL RECEIPT.

New-Bedford, March 27, 1803.

Received from Mr. N. B. the sum of ten dollars twenty-nine *cents in full of* all demands.

10 dols. 29 cts. E. D.

BILL OF PARCELS.

Newburyport, June 20, 1803.

Mr. WILLIAM HOLMAN

Bought of DANIEL GREEN,

8 hhds. sugar, wt. *viz.*

	C.	q.	lb.		C.	q.	lb.
No. 1	5	2	7	5	5	3	19
2	5	1	22	6	5	1	17
3	6	0	13	7	5	1	7
4	5	2	13	8	5	3	14
	22	2	27		22	2	1
	22	2	1				
	45	1	0				
Tare 12 pr.cwt.	4	3	11				
Neat	40	1	17	at 12 dols. per cwt.			484 82

2 bbls. sugar, *viz.*

	C.	q.	lb.			
	2	2	25			
	1	3	17			
	4	2	14			
Tare 21 lb. pr. bbl.		1	14			
Neat	4	1	0	at 10 dols.		42 50

3 hhds. molasses, *viz.*

gals.	
101—9*	
108—5	
107—7	
316—21	
21	
295 gallons at 50 cents	147 50
1 quarter cask Malaga wine	25 00
5 cases gin, at 4 dols. 25 cents	21 25
Dols.	721 07

* The ullage is thus noted.

INVOICES.

INVOICE of 20 hhd. clayed sugar and 10 hhd. coffee, shipped by ..... of Boston, in the United States of America, on his own account and risque, on board the ship ....., A. B. master, bound for ..... and a market, consigned to the said A. B. for sales and returns, viz.

20 hhds. clayed sugar, wt. viz.

B. C.		C.	q.	lb.		C.	q.	lb.
No. 1 a 20	No. 1	11	3	14	11	12	0	14
	2	10	3	21	12	10	2	14
	3	11	0	0	13	10	2	21
	4	12	1	0	14	11	3	21
	5	11	1	14	15	10	1	14
	6	10	3	7	16	10	2	0
	7	10	2	0	17	11	2	21
	8	11	0	7	18	10	1	14
	9	11	0	21	19	11	1	7
	10	10	0	7	20	10	3	14
		111	0	7		110	2	0
		110	2	0				
		221	2	7				
Tare 12 per cwt.		23	2	27				
		197	3	8 nt. at 10 d. 25 cts.				dols. cts. 2027 67

10 hhd. coffee, wt. viz.

B. C.	No.	C.	q.	lb.	Tare.	No.	C.	q.	lb.	Tare.
No. 1 a 10	1	9	2	7	108	6	6	1	14	79
	2	9	3	0	112	7	6	1	6	61
	3	10	1	21	106	8	8	2	4	84
	4	10	2	14	103	9	9	1	8	91
	5	8	0	14	94	10	10	0	14	108
		48	2	0	523		40	2	18	423
		40	2	18	423					
		89	0	18	= 9986	946				
deduct tare					946					
		9040 lb. neat at 21 cts.								1898 40
										3926 07
Premium of insuring 4176 dols. 67 cts. at 6 per cent. to cover the amount										250 60
Boston, &c.										dols. 4176 67

INVOICE.

INVOICE of Merchandize on board the brig Swan, A. B. master, shipped by A. M. on his own account and risque, for the West-Indies, and consigned to said master for sales and returns, *viz.*

	140 M. of boards and plank,	dol. 10	dols. 1400	
	20 M. of white-oak hhd. staves	30	600	
	12 M. red-oak hhd. do.	12	144	
	130 M. Shingles	3	390	
B. No.1--18.	18 hhd. of cod-fish, 17303 lb.	4 pr. C.	692	12
B. No.1--52.	52 bbls. of beef	12	624	
E. No.1--30.	30 bbls. of salmon	10	300	
F. No.1----2.	2 bbls. pork	18	36	
L. No.1---7.	7 casks of rice, neat, 39 C. 3 qr. 21 lb.	4 pr. cwt.	159	75
	3 M. of hoops	25	75	
	1300 pair of shoes	50 cts.	650	
		Dols.	5070	87

Portsmouth, Sept. 7, 1798.
Errors excepted.
A. M.

Mr. Abraham Jones, to Walter Brown *Dr.*

1803.				
Jan. 5.	For one barrel of flour	Dols.	10	
8.	4 lb. coffee	2*s.*	1	33
9.	9 lb. of sugar	11*d.*	1	37
23.	7 gallons of molasses	3*s.* 9*d.*	4	37
Feb. 7.	3 quintals of fish	15*s.*	7	50
16.	2 lb. hyson tea	8*s.* 6*d.*	2	83
Mar. 29.	5 lb. chocolate	1*s.* 6*d.*	1	25
May 5.	2 bushels of corn	4*s.* 9*d.*	1	58
		Dols.	30	23

Errors excepted.

ACCOUNTS OF SALES.

***SALES** of twenty hogsheads, seven barrels, and thirty-one bags coffee, for and on risk of Mr. William Stillman, merchant in Portland.*

1803.

March	15	William Edes, 20 hhds. wt. 14376 lb. at 23 cts. per lb.	*Dols.*	3306 48
	16	George Watts 7 bls. wt. 1493 at 23 cts.		343 39
	17	Peter Bates 31 bags 5507 23		1266 61
				4916 48
		Charges,		
		Advertising ..... *Dols.*	1 46	
		Storage	3 50	
		Commission on 4916 dols. 48 cts. at 2½ per cent.	122 91	127 87
		Neat proceeds passed to his credit	*Dols.*	4788 61

Errors excepted, &c.

***SALES** of sundry merchandize received per the ship Juno, Capt. Dane, from Machias, and disposed of for account and risk of Amos Goodwin, merchant there.*

Date	To whom sold	quintals fish	barrels oil	barrels salmon	barrels herring	cords wood	cords bark	feet boards	barrels beef	Price	Amount
1803										*Dols.*	*dls cts.*
June 4	Ja's. Yates	30								3	90
8	Wm. Rowe	120								3,27	392 40
27	John Payson		6							12	72
July 4	Ja's. Nugent						22			4	88
"	Cash			50						8,75	437 50
8	Sim. Sands							3,216		6,50	20 90
21	Stock								15	9	135
29	Paul Simson					13				3,50	45 50
Aug. 5	Jona. Rose							1,259		6	7 55
	Taken to fill up		1								
		150	7	50		13	22	4,475	15		1288 85

Remaining unsold, 40 barrels of herring.

Charges, viz.

Storage of fish	*Dols.*	10 50	
Commission on 1288 dols. 85 cts. at 2½ per cent,		32 22	42 72
Neat proceeds carried to the credit of his account,		*Dols.*	1246 13

Errors excepted, &c.

SALES of nineteen hogsheads and seven barrels of rum, received per the schooner Ruby, Richard Butler, master, from Portsmouth, for account and risk of Daniel Edwards, merchant there.

Date.	To whom sold.	19 hhds. Rum.	7 bbls. Rum.	Gallons	Price.	Contents.	Amount.
1803.					Cts.		dls. cts.
May 24	By Walter King		1	29½	100		29 50
June 2	By David Jones	2		216	100	110 and 106	216
20	By James Ray	4		438	96	108,110,111,109	420 48
24	By Aaron Judson		3	81	95	26½, 27½, 27	76 95
July 23	By ThomasRopes	1		115	95½		109 82
Aug. 3	By Parsons & Ely		1	25	95½		23 87
23	By Simon Sands	2		222	98	109, 113	217 56
Sept. 4	By Miles Young	1	1	138	96	110, 28	132 48
10	By Moses Bliss	3	1	342½	99	107,104,103, 28½	339 7
25	By Amos Dundas	6		632	98½	109,102,106 / 111, 112, 92	622 52
		19	7	2239			2188 25

Charges.

	dols. cts.	dols. cts.
Paid Capt. Butler freight of 19 hhds. rum, at 2 50		47 50
ditto .. 7 bbls.	66	4 62
Porterage 19 hhds.	40	7 60
ditto 7 bbls.	10	70
Gauging 26 casks	12½	3 25
Cooperage 3 dols. on hhds. 1 dol. 50 cts. on bbls.		4 50
Advertising		1 25
Commission on 2188 dols. 25 cts. at 5 per cent.		109 41
		178 83

Neat proceeds .. *Dols.* 2009 42

Outstanding in hands of

	dols.	cts.
Moses Bliss	339	7
Amos Dundas ..	622	52

Boston, 25th *September*, 1803.

Errors excepted, &c.

SALES of the ship Hiram's Cargo, by William Sutton.

1803.		lb.			liv.	sol.	den.	liv.	sol.	den.
May 24.	65 hhd. fish, wt. nt.	72587	at 33	liv. per 100,	23953	14	2			
	6 do. do.	6513	32		2084	16	0			
	2 do. do.	2136	31		662	3	2			
	34 do. do.	36658	30		10997	8	0			
	2 do. partly dam.	2184	sold at auction for		226	0	0			
								37924	1	4
	109		liv.	sol.	den.					
	24 bbls. beef	at 101	1	3	per bbl.	2425	10	0		
	7 do. do.	99	8	5		695	18	11		
	29 do. do.	90	15	0		2681	15	0		
	4 do. do.	83	0	0		332	0	0		
								6083	3	11
	64		liv.	sol.						
	13 bbls. pork	136	0			1768	0	0		
	25 do. porter	80	0			2000	0	0		
	3 boxes linen, con. 169 pie.	96	0	pr. pie.		1624	0	0		
	14 firkins butter, wt. 1179 lb.	2	5	pr. lb.		2540	5	0		
	5 thousand hoops	240		per M.		1200	0	0		
	59 do. shingles	16		do.		944	0	0		
15949	feet boards	120		do.		1913	17	7		
	170 shaken hhds.	8¼		per hhd.		1402	10	0		
								27992	12	7
								72001	17	10
	Commission on 72001 17 10 at 5 per cent.							3600	1	10
							Liv.	68401	16	0

Errors excepted, &c.

Disbursements, Duties, &c. paid on ship Hiram, by Wm. Sutton.

1803.		liv.	s.	d.	liv.	s.	d.
May 18.	Paid for a barrel of flour	86	10	0			
	.. to the admiralty	240	11	6			
	.. for fresh meat	56	12	5			
	.. for flats to unload with	341	13	6			
					725	7	5
	Paid to the harbour master	66	10	4			
	.. for storage and negro hire	619	14	8			
	.. for inward duties	714	11	7			
	.. for outward duties	229	13	5			
					1630	10	0
	Paid for brokerage	821	13	6			
	.. for passport and certificate	68	19	7			
					890	13	1
				Liv.	3246	10	6

Point-Petre, Guadaloupe, July 12, 1803.

Errors excepted,

WM. SUTTON.

	hhd.	lb,	liv.	lb.	liv.	s.	d.	liv.	s.	d.
June 12. To 24 sugar wt.nt.		35543	at 58	pr 100,	20498	18	9			
7 do.		9055	42		3803	2	0			
12 do.		19983	43		8592	13	9			
	43	64381						32894	14	6
		sol.	d.							
To 4856 lb. coffee at	22	6	per lb.		5463	0	0			
2019 do.	23				2321	17	0			
6523 do.	23	6			7664	10	6			
5247 do.	24				6296	8	0			
	18645 in 20 hhds. and 6 barrels							21745	15	6
To 19 bales cotton 4645 lb. at 140 liv. pr 100,					6503	0	0			
To 2661 veltes of molasses, at 24 sols per velt,					3193	4	0			
	liv.	s.	d.					9696	4	0
To commission on 64336	6	4	at 2½ per cent.					1608	8	4
To am't of disbursements, duties, &c. per account annexed								3246	10	6
								69191	12	10
Balance in cash on board,								960	3	2
				Livres				70151	16	0

1803.		liv.	s.	d.
June 10.	By neat proceeds of Ship Hiram's cargo, per account of sales annexed	68401	16	0
	By cash brought out	1750	0	0
	Livres	70151	16	0

Point-Petre, Guadaloupe, July 12, 1803,
Errors Excepted.
WILLIAM SUTTON.

Dr. *Mr. John Johnson in account current with William Roberts.* Cr.

1803.		dols.	cts.	1803.		dols.	cts.
May 19.	To cash advanced per receipt	300		Oct. 28.	By ship Columbia, for hull thereof complete, being 171½ tons, at 16 dl.	2744	
June 5.	To sundries per bill	458	12				
July 25.	To payment of his order to M. B. for	100					
29.	To 1 bag coffee 96 lb. at 20 cents	19	20				
Aug. 1.	To cash per receipt	450					
—	To 5 hhds. rum 555 gals. at 83⅓ cents	462	50				
—	To 3 boxes glass 7 by 9, 10 dols.	30					
Sept. 2.	To sundries per bill	228	56				
—	To cash per receipt	385					
20.	To 12 bl. flour at 8 dols. 4 bl. pork at 12	144					
25.	To 1 hhd. sugar 8 cwt. 2 qrs. 7 lb. nt. 10 dols.	85	62				
Oct. 29.	To cash and sundries in full	81					
		dols. 2744				dols. 2744	

Salem, October 28, 1803.

Errors Excepted.

WILLIAM ROBERTS.

Messrs. Wilson & Gale in account current with William Duncan.

Dr. Cr.

1803.		dols. cts.	1803.		dols. cts.
May 19.	To 1 barrel flour .... delivered Wilson	9 50	Sept 10.	By amount of their account for repairs on the ship America	119 25
28.	To cash ..... Gale	28 50			
		3 50			
June 22.	To 15 lb. butter 15s. tea 6s. ... Wilson	7 50			
		5			
29.	To 3 quintals scale fish, at 15s. Gale	7 25			
July 2.	To 1 half barrel flour ..... do.	25			
		12 50			
15.	To 12 lb. coffee 18s. 28 lb. sugar 25s. 6d. do.	8			
		12 50			
20.	To cash ..... Wilson				
26.	To 15 bushels corn at 5s. ..... Gale				
Aug. 2.	To 8 do. rye, at 6s. ..... Wilson				
	To paid their order to James Rowe				
		dols. 119 25			dols. 119 25

Newburyport, 27th. Sept, 1803.
Errors excepted.
For Mr. WILLIAM DUNCAN,
SAMUEL TRUSTY.

Cr.

Mr. James Richardson, in account current with Thomas Seccome.

1803.		dols. cts.	1803.		dols. cts.
Dec. 12.	To sundries per bill	28 20	Oct. 12.	By schooner William for blacksmith's work per bill, viz. 6325lb. at 6 c. 759lb. tare at 12 per ct. 7084 lb. supplied per Dr.	379 50
	To 53 bars Iron, wt. 21 2 10 for schooner William				
	15. To 121 do. .....41 2 18 do. do.				
	26. To 1 hhd. W. I Rum qt. 107 gals. at 96 cts.	102 72			
Jan.	28. To Cash per receipt	180 00			
	29. To 4 bbls. flour at 9 dols. 50 cts.	38 00			
Oct.	21. To cash paid his order to James Wise	28 00			
	To cash in full	2 52			
		dols. 379 50			dols 379 50

Newburyport, 12th. October, 1803.
Errors excepted.
THOMAS SECCOME.

N. B. When a person is furnished with his account current, it is necessary to specify the various charges, and when they are numerous, some accountants make but one charge of them, in the account current, referring to an annexed account of the several articles thus included.

BILL OF SALE.

TO all people to whom this present Bill of Sale shall come, I R. P. of Newburyport, in the State of Massachusetts, Merchant, send Greeting; KNOW YE, That I the said R. P. for and in consideration of the sum of *three thousand, two hundred and twenty-two dollars*, to me in hand well and truly paid at or before the ensealing and delivery of these presents, by S. T. of the said Newburyport, Merchant, the receipt whereof I do hereby acknowledge and am therewith fully and entirely satisfied and contented, have granted, bargained and sold, and by these presents do grant, bargain and sell, unto the said S. T. all the hull or body of the good brig Sally, together with all and singular her masts, spars, sails, rigging, cables, anchors, boats, and appurtenances, now lying at Newburyport, and registered at the port of Newburyport, the certificate of whose registry is as follows:

IN pursuance of an act of the Congress of the United States of America entitled, "AN ACT concerning the registering and recording of ships or vessels, R. P. of Newburyport, in the state of Massachusetts, Merchant, having taken or subscribed the oath required by the said act, and having sworn that he is the only owner of the ship or vessel called the Sally, of Newburyport, whereof William Knapp is at present master, and is a citizen of the United States, as he hath sworn, and that the said ship or vessel was built at Salisbury, in the said state, in the year seventeen hundred and ninety-nine, as also appears by a certificate of enrolment, No. 129, issued in this district on the fourth day of August last, now surrendered—and N. S. surveyor of this district, having certified that the said ship or vessel has one deck and two masts, and that her length is sixty-nine feet five inches, her breadth twenty-two feet and one half inch, her depth eight feet two inches, and that she measures one hundred and six tons and forty ninety-fifths, that she is a square sterned brig, has no galleries and no figure head, and the said R. P. having agreed to the description and admeasurement above specified, and sufficient security having been given according to the said act, the said brig has been duly registered at the port of Newburyport.

Given under my hand and seal at the port of Newburyport, this first day of January, in the year one thousand eight hundred.

To have and to hold the said granted and bargained brig Sally and premises with the appurtenances, unto the said S. T. his heirs, executors, administrators or assigns to his only proper use, benefit and behoof forever. And I the said R. P. do avouch myself to be the true and lawful owner of the said brig and appurtenances, and have in myself full power, good right and lawful authority to dispose of the said brig as aforesaid, and her appurtenances in manner as aforesaid, and furthermore I the said R. P. do hereby covenant and agree to warrant and defend the said brig and premises, with the appurtenances against the lawful claims and demands of all persons whatsoever unto the said S. T. In witness whereof, I the said R. P. have hereunto set my hand and seal, this tenth day of June, in the year of our Lord one thousand eight hundred.

Dr. *Mr. Thomas Gibson in interest*

	dols.	cts.				days.	dol.	ct.
To Int. on	35	00	fr. Jan. 31 '96	to	Oct. 12'96	256	1	47
To do. on	2962	19	Feb. 2	to	do.	254	123	68
To do. on	2590	42	May 31	to	do.	134	57	06
To do. on	1733	97	July 2	to	do.	102	29	07
To do. on	73	63	July 12	to	do.	92	1	11
To do. on	455	52	Aug. 25	to	do.	47	3	51
To do. on	158	71	Sep. 30	to	do.	12	0	31
						dols.	216	21

Dr. *Mr. William Mace in interest*

1798.	dols.	cts.	y.	m.	d.	dols.	cts.
March 3. To Interest on	3869	20	for 1	5	11	335	97
April 26. on	273	6	1	3	18	21	29
Aug. 18. on	400			11	26	23	73
Dec. 28. on	414	6		7	16	15	59
'99 Ja. 15. on	200			7	9	7	30
Feb. 19. on	300			5	25	8	75
March 26. on	1300			4	18	29	90
					dols.	442	53

unt with Thomas Merchant **Cr.**

	dols.	*c.*						*days.*	*dols.*	*ct.*
erest on	500		from	Apr.	24, '96,	to	Oct. 12 '96,	171	14	5
do.··	1133	25	·····	25	·····	12	··	170	31	67
do.··	296	24	May	3	·····	12	··	162	7	88
do.··	215		·····	5	·····	12	··	160	5	65
do.··	215	80	June	9	·····	12	··	125	4	43
do.··	109	74	·····	24	·····	12	··	110	2	0
do.··	517	90	July	20	·····	12	—	84	7	15
ce due on this account carried to the debit of ac't.									143	38
								dols.	216	21

Salem, &c.

Account with Thomas Merchant **Cr.**

1799.		*dols. cts.*			*dol. cts.*
Jan. 16.	By interest on	339 67			
		427 81			
			Y.	*m.* *d.*	
		767 48	··	6 18	25 32
Balance carried to account current ·····					417 21
				dols.	442 53

Salem, August 26th, 1799.

Errors excepted,

THOMAS MERCHANT.

CHARTER-PARTY.

THIS Charter-party of affreightment indented, made and fully concluded upon this ninth day of June, in the year of our Lord, one thousand eight hundred, between J. P. of Boston, in the county of Suffolk, and Commonwealth of Massachusetts, merchant, owner of the good ship Helen, of the burden of two hundred tons, or thereabouts, now lying in the harbour of Boston, whereof R. P. is at present master, on the one part, and C. D. of said Boston, merchant, on the other part, *Witnesseth*, That the said J. P. for the consideration hereafter mentioned, hath letten to freight the aforesaid ship, with the appurtenances to her belonging, for a voyage to be made by the said ship to London, where she is to be discharged (the danger of the seas excepted) and the said J. P. doth by these presents covenant and agree with the said C. D. in manner following, *That is to say*, That the said ship in and during the voyage aforesaid, shall be tight, staunch and strong, and sufficiently tackled and apparelled with all things necessary for such a vessel and voyage; and that it shall and may be lawful for the said C. D. his agents or factors, as well at London as at Boston to load and put on board the said ship, loading of such goods and merchandize as they shall think proper, contraband goods excepted.

IN consideration whereof the said C. D. doth by these presents agree with the said J. P. well and truly to pay, or cause to be paid unto him, in full for the freight or hire of the said ship aforesaid the sum of three dollars per ton, per month, and so pro rata for a less time, as the said ship shall be employed in the aforesaid voyage, and sixty days after her return to Boston. And the said C. D. doth engage to pay the charge of victuals and mariners wages, all port charges and pilotage during said voyage, and to deliver the said ship on her return to Boston, to the owner aforesaid or his order. And for the true and faithful performance of all and singular the covenants, payments and agreements aforementioned, each of the parties aforenamed bind and oblige himself his executors and administrators, to the penal sum of two thousand dollars firmly by these presents. In witness whereof the parties aforesaid have hereunto interchangeably set their hands and seals the day and year afore-written.

BILL OF LADING.

J. R.
1 *to* 53
casks potash
ton cwt.
9 16 *l. s. d.*
at 80s 35 12 0
Primage 5
pr. ct. 1 15 7

£37 7 7

SHIPPED in good order and well conditioned by John Rolfy, in and upon the good ship called the Isis, whereof is master for this present voyage Charles Ely, and now riding at anchor in the harbour of Newport, and bound for Liverpool, to say *fifty-three casks of potash, containing eight tons and eighteen cwt* being marked and numbered as in the margin, and are to be delivered in the like good order and well conditioned, at the aforesaid port of Liverpool (the danger of the seas excepted) unto Mr. J. May or to his assigns, they paying freight for the said goods, *four pounds* British sterling *per ton*, with five per cent. primage. In witness whereof, the master or purser of the said ship hath affirmed to three bills of lading all of this tenor and date, the one of which being accomplished, the other two to stand void. Dated in Newport, July 7th, 1800.

C. ELY.

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A Handsome assortment of BOOKS in the various departments of LITERATURE.

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Handsome folio BIBLES, with plates; royal quarto do.; Oxford and Edinburgh quarto do. with and without Apocrypha; octavo do.; elegant and common pocket do.; Edinburgh school do.; Testaments; Church Prayer Books, elegant pocket edition; common do. do.; Belknap's Psalms and Hymns, (morocco and common bindings;) Watts' do. do.; do. in miniature; Smith and Sleeper's Hymns, &c. &c.

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Medium, demy, thick and thin folio post, foolscap and quarto post English PAPER, of every kind—foolscap and pot American do. of various qualities—Bonnet Board—Wrapping Paper—Quills, of every quality and price—Slates, of all sizes—Wafers—Sealing Wax—red and black Ink-Powder—lead, slate, and camel's-hair Pencils—Copy Slips—Inkstands, of all kinds—boxes of Paints—Penknives—India Rubber—Playing Cards, &c. &c.

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BOOK-PRINTING AND *BOOK-BINDING*

EXECUTED WITH NEATNESS AND DISPATCH.

October, 1803.

...m of GILEAD.

Price Three Dollars a Bottle.

...ared (only) by the sole proprietor and Inventor, S. Solo... ...Author of "The Guide to Health," and other valuable works, ...use, *Solomon's Place, Liverpool.*

.....

The train of melancholy disorders which afflict the human frame, under the denomination of nervous diseases, are the principal sources of human misery in the privation of health. Those disorders proceed from such an infinite variety and complication of causes, as to render it impossible, if it were even always necessary, to trace them to their true source. The effects however, are but too well known and too severely felt by too great a portion of mankind; and to these effects, it may without exaggeration be asserted, that any remedy superior or more celebrated than Dr. Solomon's Cordial Balm of Gilead, never has been discovered. In all delicate, weakly, and relaxed constitutions, lowness of spirits, hypochondria, horrors, tremblings, weakness of sight, loss of memory, impaired vigour, tabes dorsalis, nervous consumptions, and the numberless symptoms of impaired and tottering constitutions, whether arising from a life of inactivity, intemperance, or inattention to health. Its efficacy has attained throughout the three kingdoms universal and unparalleled celebrity.—By strict perseverance in its use, it chears, braces and invigorates the whole system, and gives new tone to all the vital functions, of which numberless instances can be avouched, Thousands this day in the three kingdoms live to bless the day they first applied to this admirable remedy, and enjoy the blessings of health, who might otherwise have dropped into an untimely grave, the victim of an early imprudence.

.....

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Interesting to all sea-faring People.

DOCTOR LEE'S

PATENT NEW-LONDON BILIOUS PILLS

Prepared (ONLY) by SAMUEL H. P. LEE, Member Medical Society, Practitioner of Physic and Surgery, and Apothecary, in New-London, (Con.)

Patent-right secured agreeably to Act of Congress.

IN an advertisement like this, it may be said with truth, that these BILIOUS PILLS are highly esteemed and universally known throughout the United States and West-Indies, for their extraordinary virtues, in preventing and removing all those complaints, which arise from bilious redundancies in the stomach and bowels, causing fevers, of the bilious, yellow, inflammatory, malignant, remittant, intermittant and epidemic kinds: they cure foul stomachs, where pukes are indicated—jaundice—cholics—dysentary, or bloody flux—costiveness—worms—sick head-achs—indigestion—dropsy—colds—scurvy—sore-throats, &c. &c.—They are effectual to restore the system, after a debauch of excessive eating and drinking—of great fatigue in travelling on land, or exercise at sea—and in hot and sickly countries, when taken once in 5 or 6 days, are the best preventatives against fevers, and when attacked, the best remedy ever yet known to break the disease. They may be used with the greatest safety, and without any interruption in business. Their operation is that of a mild, easy and effectual purgative, and therefore always supercede the necessity of pukes, for they clear the stomach as effectual, but without any exertions or pains. These pills have now a reputation far beyond any thing of the kind ever yet offered to the public, having been experienced by sea-faring people, as well as others, for a number of years past, and the demand for them increasing beyond the most sanguine expectations—few people do, and none ought ever to go to sea without a supply of them, as they value their lives and healths:—A captain of a merchantman assured the Patentee, that he once saved the crews of a number of vessels in the West-Indies, when the yellow-fever raged on board the American shipping, with the stock of pills he had on board.

For the information of the public, particularly those who travel by sea, they are hereby respectfully informed that the above, and only

Genuine Patent New-London Bilious Pills

are kept for sale at the following sea-port towns; where they may always be supplied, upon application to the Agents, *viz.*

Otis Little, *Castine*—Thomas Bartlet and Mr. Fennelly, druggists, *Boston*—James Logan, *Kennebeck*—Shirly Erving, *Portland*—Benj. Page, *Hallowell*—Josiah Dwight, *Portsmouth, (N. H.)*—Edmund M. Blunt, *Newburyport*—Joseph Osgood, jun. *Salem*—James Tappan, *Gloucester*—Caleb Green, *New-Bedford*—Dr. Swift, *Taunton*—Charles Teke, *Newport*—Wm. Wilkinson, *Providence*—Dr. Burr, *Warren*—Samuel Trumbull, *Stonington*—The Patentee, *New-London*—Dwight Ripley and Samuel Tyler, *Norwich*—Joseph Lyndes, *Hartford*—Josiah Willard, *Weathersfield*—Dr. Hall, *Middletown*—Dr. Mather, *Saybrook*—Medad Stone, *Guilford*—Hotchkiss and Lewis, *New-Haven*—V. Wetmore, *Stratford*—Robert Bach & Co. 128, Pearl street; Peter Clark, Pearl street; Hull and Bowne, 146, Pearl street; Dr. Van Soligen, Maiden lane; J. and J. Posts, Wall street; William Adams, 120, Fly-market—J. and M. Paff, 127, Broad-way, and A. Stansbury, *Newyork*—Robert Gourley, *Newburgh*—James L. Van Kleck, *Poughkeepsie*—Dr. Waldo, and Gardner and

[illegible]— Dr. Cromwell, Carlisle—Samuel Dexter and Thadeus Pa[illegible]
—[illegible]r and [illegible]—James Chapman, Elizabeth-town,
—Robert Erskine, [illegible]—Dr. Riddle, Burlington, (N.J.)
David Jackson, [illegible] Post-office, and Jackson and Dickson, Philadelphia—James Wilson, Washington, (D.C.)—James Kerr, Baltimore—John Templeman and Th. Dunnan, in Washington City—John Marsh, George-town, (Ph.)
Theodore Green, Fayetteville,—Fowler and Lester, Petersburgh—Edward M[illegible], Norfolk—Wm. Pritchard, Richmond—Edward Pasteur, Newbern, (N. C.)—Brown and Halsey, Wilmington, (N. C.)—Dr. Joseph Kirkland, Moreton street, Charleston, (S.C.)—Dr. Francis Marshall, George-town, (S.C.)
Messrs. [illegible] Habersham and Dr. Harrell, Savannah—Cook, Williford and Co. [illegible]rgia, (G.)—&c. &c.

To prevent any fraud or imposition, from dealers in other Pills, of similar [illegible]es and names, you must be particular to inquire for *Dr. Lee's Great NEW-LONDON Bilious Pills*, and before you purchase please to examine the bill of Direction, wrapped round each box, and see if the word "New-London" precede the words Bilious Pills—and on which they are not genuine ;----This caution is necessary to be particularly observed at all times--Directions for using, and [illegible]e certificates of their intrinsic virtues, are specified in the bills covering each box.

* * * *

The following case was communicated to the Patentee, for publication.

NEW-LONDON, AUGUST 7, 1802.

Doctor S. H. P. LEE,

New York Dec 1833

DEAR SIR,

HAVING a very great opinion of your Bilious Pills, and experienced their good effects in my family for four years past, and observing with much anxiety the annual return of the *Bilious Yellow Fevers*, in many of our large towns, and believing that your pills are the best remedy for preventing and curing those destructive diseases of any—I hereby hand you a short statement of my own case, which I request you to make public, for the benefit of mankind :—On the first of October, 1798, I was attacked in my office with the *Yellow Fever*, then raging very violently in this city.—Having lost my journeyman with the fever, and my family being about two miles out of town, and finding my situation very critical, I immediately left town to join my family ; and took with me a box of your "*New-London Bilious Pills*;" and not being regularly attended by any physician, I was under the necessity of becoming my own doctor. My fever raging very rapidly, I began with taking your pills, and soon found relief ;—Being thereby encouraged, I continued in the use of them until I recovered, and have not the least doubt but they were the means of saving my life. My wife also was attacked on leaving town, but soon recovered on the use of them. I have ever kept them in my family since, and always shall, as being the best domestic physic for most of the complaints that occur.

I am your obedient servant,
JAMES SPRINGER,
Late Editor of the Weekly Oracle.



